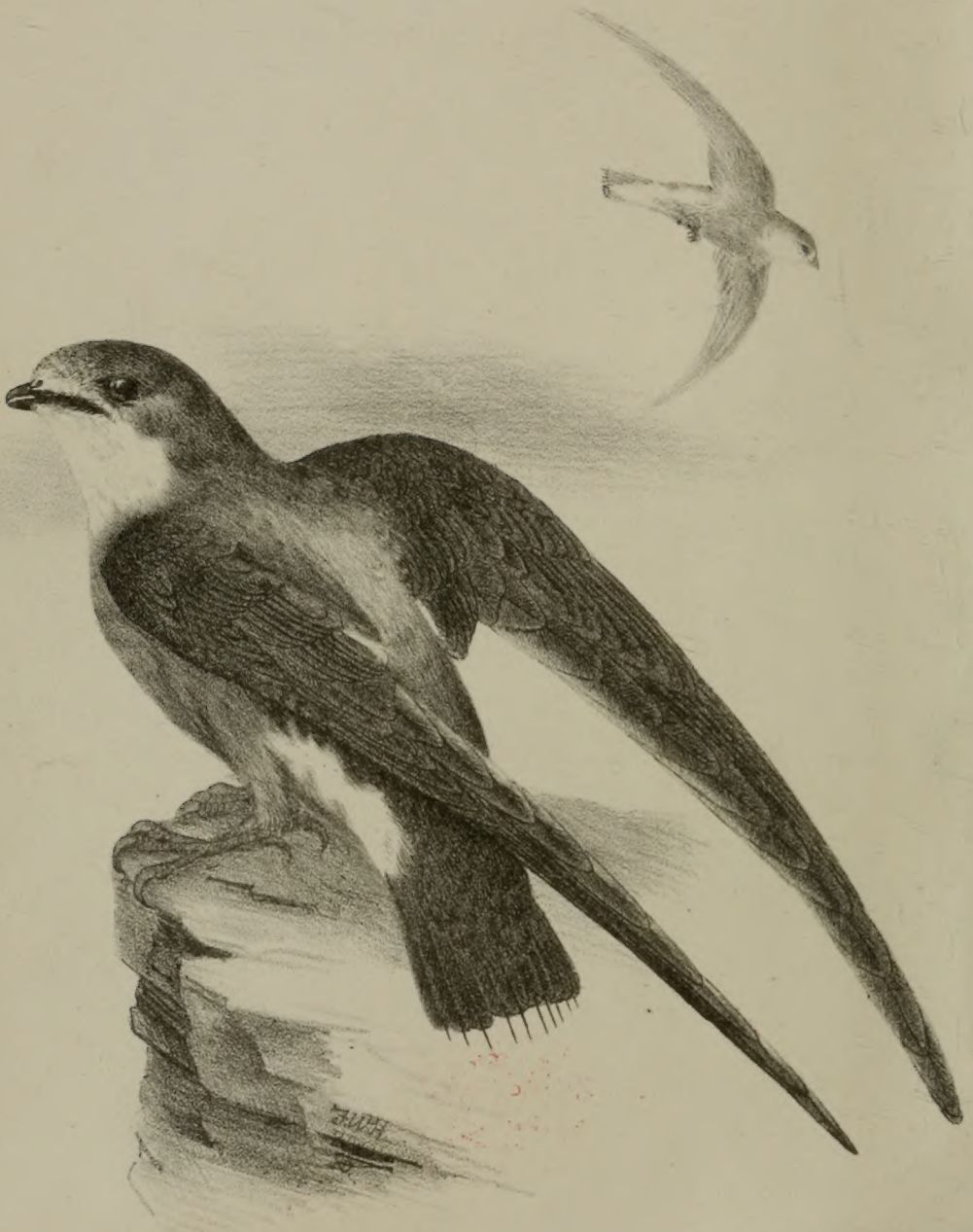


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PREFACE.

IF some shadow of regret is caused by the reflection that another year has passed away since the Editor indited a Preface to 'The Zoologist,' there is at least this consolation to be found that the year has not been spent idly. Many workers have been busy in the field of Zoology, and the result of their labours and investigations has been generously communicated to this Journal to afford pleasure and instruction to others. Indeed on glancing over the Index to the annual volume, the Editor feels that he has good cause to be grateful to the many correspondents who have favoured him with communications during the past year. In almost every branch of Zoology some contribution to knowledge has been made.

In the case of MAMMALS, Mr. A. H. Cocks has given an interesting account of the result of his enquiries in Norway concerning the survival of the Beaver in that country, an account rendered all the more valuable from the regrettable fact that the extinction of this animal in Europe cannot be very far distant. The same contributor's remarks on the question of the specific identity of the Ferret and Polecat will be acceptable to those still sceptical on the subject.

There is still much to be learnt concerning the distribution of the smaller British mammals, and such items of intelligence as those communicated by Mr. D'Urban on the Red Field Vole in Devonshire (p. 487), Mr. Rope on the Harvest Mouse in Suffolk (p. 57), and Messrs. Chichester Hart, Cordeaux, and Parker on the occurrence of the Pine Marten in their respective districts are always welcome.

Comparatively few observers are so situated as to have opportunities of studying the Marine Mammalia, and hence such observations as those on the Great Grey Seal by Mr. Warren (p. 358) and on the White-beaked Dolphin by Mr. Southwell (p. 220) are the more acceptable.

As regards BIRDS, numerous interesting communications have been received during the past year, amongst which some half-dozen especially deserve mention, namely, the Report on Migration by Messrs. Harvie Brown and Cordeaux (pp. 161—204), Mr. Howard Saunders' account of the habits of the Skuas as observed in Shetland (p. 1), Mr. Chichester Hart's Notes on the Ornithology of the British Polar Expedition, 1875-6 (pp. 121, 204), Mr. Seebohm's papers on the habits of the Marsh Warbler (p. 377) and nesting of the Spoonbill (p. 457). The occurrence of the Needle-tailed Swift for the second time in England, of which so pleasing an account (with a figure of the bird) has been given by Mr. Corbin (p. 81), is too remarkable to pass unnoticed, while many others might be mentioned which bear testimony to the careful attention which is being paid to Ornithology in various parts of the kingdom.

On REPTILES at least one communication has appeared (p. 408); more would have been welcome

On the subject of FISHES, Dr. Day has favoured us with several interesting and valuable papers, such as those "On the Air-bladders of Fish" (p. 97), "On the Origin of Varieties in *Salmonidæ*" (p. 133), and "The Fresh-water Fishes of India" (pp. 431, 461); while Messrs. D'Urban, Gatcombe, and Cornish have recorded the capture of several rare or little-known fishes on the sea-board of Devon and Cornwall. Mr. Carrington's position as Naturalist at the Westminster Aquarium has enabled him to supply some interesting notes at various times on rare British CRUSTACEA and RADIATA (as at p. 72); nor have the MOLLUSCA (pp. 222, 367) or the ANNELIDES (p. 409) been uncared for.

It is thus pleasant to find workers in so many branches of Zoology communicating so agreeably the results of their researches. From the increasing interest which is being manifested in the study of Natural History, the Editor is induced to hope that he may long continue to receive such interesting articles as those with which he has been favoured during the past year—articles which establish such pleasant relationship with the writers, and so agreeably lighten the task of editing.

J. E. H.

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EXPLANATION OF PLATES.

PLATE 1.

(FRONTISPIECE.)

THE NEEDLE-TAILED SWIFT, *Acanthyllis caudacuta*.

PLATE 2.

(To face page 273.)

THE PEREGRINE FALCON, *Falco peregrinus*, showing the arrangement of feathers on the upper and under sides of the wing.

Head of same.

Closed wing of same.

PLATE 3.

(To face page 280.)

THE GOSHAWK, *Astur palumbarius*, showing the arrangement of feathers on the upper and under sides of the wing.

Closed wing of same.

Foot of same.



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ON THE SKUAS AND SOME OTHER BIRDS OBSERVED IN THE SHETLAND ISLANDS.

BY HOWARD SAUNDERS, F.L.S., F.Z.S., &c.

HAVING recently spent a month in the Shetland Islands for the express purpose of observing the two species of Skuas which breed there, and of examining the different stages of their young, it is natural that I should have read with interest the remarks of Mr. Purnell (Zool., 1879, p. 455), on the dangers which, in his opinion, threaten the Great Skua (*Stercorarius catarrhactes*). No one can fail to admire, and be anxious to preserve, these magnificent birds, whose boldness would speedily bring about their extermination, if any one wished to kill them down; but whilst cordially sympathising with Mr. Purnell in his desire to see them protected, it is possible that his fears for their extinction are hardly warranted by the facts, and may be the result of exaggerated or inaccurate statements made to him. In those islands the "Bonxie" is a bird much talked of, not only by those who know it well, but by many persons who really know next to nothing about it. So far from the Great Skua having diminished in numbers during the last few years, it has certainly, so far as its breeding-place in Unst is concerned, become more abundant than when Dr. Saxby wrote, and, except from the inclement summer, I do not think its numbers have suffered in 1879. My friend, Mr. Abel Chapman, of Sunderland, who was there last May, found five pairs of birds and several nests with eggs, or rather, speaking from memory, with but one egg in some cases instead of the usual two, probably owing to

the cold wet weather. On 16th July I counted five pairs of old birds for certain, and I think there was a sixth pair, but possibly one pair may have been counted twice over. I also found one young, in down, belonging to one pair, and another, half-fledged, appertaining to another pair; neither of these, to judge from their actions, had more than one young one. Another pair certainly had young very near, as their swoops were fierce and rapidly repeated, but I had not time for a prolonged search. Of the rest I cannot speak positively, as I did not happen to infringe upon their particular domain, and consequently was not guided to their young by their attacks, which always increase in violence as you get "warmer," until you are actually over the young. Then both birds come swooping down as fast as they can charge, and, wheeling short, they repeat their attacks as long as the intruder remains. So far then as the Unst Skuas are in question, it is clear that their numbers had suffered no diminution in 1879, and that the statements made to Mr. Purnell, as to some of them having been lately shot by parties to whom leave was given to shoot Richardson's Skuas, are inaccurate. Mr. Edmonstone, to whom their breeding-ground belongs, said nothing to me about it, and he could hardly have failed to do so had it occurred recently, for the Great Skua was the main subject of our conversations, and he takes the greatest pride in the preservation of his birds. The place where they breed is a good way from Balta Sound, and it would be almost impossible for any one to get on it, with or without a gun, without the fact being known; and, as the first shot would betray him, his retreat could be easily cut off, after which the intruder would probably pass a bad time. I have also reason to believe that there is another colony, if not two, in the islands; but it would be quite unnecessary to hint at the localities.

At Rona's (properly Roeness) Hill, the highest ground in Shetland, which was formerly the best known of the breeding-places of the Great Skua, I did not see any from the sides or summit, although the vicinity was carefully swept with a powerful glass, but I am inclined to believe the statement of a very intelligent sailor who knew the birds well, and was positive as to some having been there a few years ago. It was generally supposed that they had been exterminated in that locality by Dunn, a bird-stuffer of Hull, who afterwards settled at Stromness,

Orkney, and whose son, lately deceased, was an excellent collector. Many will recollect Mr. Hewitson's energetic denunciation of this "atrocious" ('Eggs of British Birds,' ii., page 505), but like some other atrocities, I believe it was much exaggerated, and, at all events, that Dunn was by no means the sole offender. There can, however, be no doubt that the Great Skua's numbers were much diminished, but it is quite possible that their total extermination has been too easily believed in. There is a great deal of human nature in Shetland, and next to having Skuas on one's property, the next pleasure is to believe and assert that no one else has any. Thanks to Dr. Saxby and the Edmonstone family, the birds of the Island of Unst are far better known to us than those of any other, but the remoter portions of the other islands are still unexplored by the ornithologist, and they would amply repay investigation, not merely as regards Skuas, but many other species.

Although Unst is the most accessible of the breeding-places of the Great Skua, their stronghold is in the small island of Foula, the most westerly of the group. There on the mist-drenched storm-swept summit, from 1100 to 1300 feet above the sea, is the real home of the Skua, and long is it likely to continue the lord of that domain. A few eggs are, doubtless, taken every year and sold in Lerwick by a venerable native of Foula, but it has to be done surreptitiously, and woe betide any of the few inhabitants or any visitor who may be detected in touching either eggs or birds when Mr. John Scott, of Melby, at present a minor of about six feet high, and pugnacious to boot, attains his majority. There is not a gamekeeper in the United Kingdom more jealous of his pheasants than the Scotts are of their Skuas. Foula is also very difficult of access, owing to the stormy seas which surround it; the landing, generally difficult, is frequently impossible (the sailing-boat carrying the vicarious mail was wrecked whilst I was in Shetland), and an excursion thither can hardly be made for less than five pounds; so that, all things considered, the Skuas are tolerably safe there. In the Faroe Islands, whence our principal supply of birds and eggs has of late years been derived, they are, I fear, becoming annually scarcer, for although partially protected on their breeding-grounds by some of the proprietors, the bird is in the proscribed list of species on which a "neb-toll" is paid by the Danish authorities,

and is, therefore, liable to be shot over the sea by fishermen and others. An excellent account of this species, as observed there by Capt. H. W. Feilden, will be found in 'The Zoologist' for 1872.

The Arctic, or, as I prefer to call it, to avoid any ambiguity, Richardson's Skua, is tolerably abundant in several of the Shetland Islands, but the easiest breeding-place to visit is that on the Island of Noss, near Lerwick, the capital of Mainland. No one is allowed even to land on Noss without a written permission from the owner, who lives on [the Island of Bressay, and this permit has to be given up to the shepherd, so that the birds are in no danger of persecution, except from egg collectors. There must be quite fifty pairs on Noss, and I succeeded in examining many examples of the young in all stages, from the down to those full-fledged and ready to fly, without, I am happy to say, being under the necessity of depriving them of life by turning them into specimens. Mere amassing not being my object, it was only necessary to sit down and describe each individual from life, but the deductions from these observations must be reserved for my monograph. In the adult the dark forms were in the majority; but there was a fair proportion of the white-breasted ones, and the two varieties pair freely, as has already been recorded by other observers.

With regard to the vernacular name of this species, the term Richardson's Skua, although originally bestowed on the dark variety, has been applied to no other species, and is, therefore, preferable to that of Arctic Skua, which has sometimes been used for the Long-tailed or Buffon's Skua. The scientific name of *Stercorarius parasiticus* (Linn.), was most clearly intended for the latter, the description being unusually precise. Linnæus, in his 'Fauna Suecica,' p. 55, and also in 'Syst. Nat.,' p. 226, says of *Larus parasiticus*, "rectricibus duabus longissimis," which can only apply to the Long-tailed or Buffon's Skua; and there are other points for which the reader may be referred to 'Proceedings of Zoological Society' for 1876, p. 327. The earliest and proper name for Richardson's Skua is *Stercorarius crepidatus* (Gm., ex. Banks and Latham).

I can add nothing respecting the breeding of the Fulmar Petrel in Foula, already recorded in these pages, and I did not see the Manx Shearwater on many occasions, nor the Storm

Petrel on more than one. The feature of those northern seas is the presence of the Black Guillemot, or "Tystie," and, as everyone knows, the cliffs are thronged with the usual Gulls, Guillemots, Razorbills, and Puffins. The only species which I had never seen before was the Long-tailed Duck or "Calloo," which flew past our boat in Sommer-voe; it is an unmistakable bird, and there can be no doubt that it breeds in the unfrequented lochs of Yell and the neighbourhood. I also had the good fortune to see an adult Great Northern Diver, *on the wing* strange to say, and there can be no doubt that this species also breeds in Yell, whence Dr. Saxby obtained eggs. Just before I left Lerwick, on 28th July, one was brought in *alive* by the small steamer which visits the northern islands, and although I did not see it myself, those who did, and who told me about it, are, or ought to be, quite aware of the difference between the "Immer-geese" and the "Rain-geese," as the Red-throated Diver is called.

I cannot say I believe in the reported nesting of the Golden Eagle in Bressay alluded to in 'The Zoologist,' 1879, p. 461; the story did not bear sifting, nor was the evidence satisfactory as to the nesting, in 1879, either on Bressay or on Noss, of the White-tailed Eagle, which, however, did breed there two or three years ago. The boatmen and others, who pretended to know so much about the breeding of *both* these species, were not to be induced by a reward to point out even the used, and, by that time, abandoned nest, and I did not see an Eagle of any kind during my frequent visits. Nor did I see the Peregrine Falcon, but the skeleton of a Richardson's Skua was picked up, the breast-bone of which had a notch bitten out of the centre, the mark a Peregrine generally leaves. Dr. Saxby expressed a doubt whether the Peregrine would not interfere with the introduction of Grouse, which do fairly well in Orkney, but the plague of Hooded Crows is a far greater drawback, and until their numbers have been systematically diminished by shooting and by laying down poisoned eggs, it is useless to hope for any success.

Amongst the Waders the most interesting species which I found breeding was the Whimbrel, whose clear rippling note first attracted my attention when looking for young Skuas on Noss, but in Yell and some of the other islands it is tolerably abundant. A pair of Turnstones were seen on the shore of one of the smaller northern islands, the one, I believe, where Dr. Saxby

found a nest with three eggs, and he also states that he obtained eggs of the Greenshank in Yell. That island need have something to recommend it, for it is the dreariest and least picturesque of the group. The moorlands are everywhere enlivened by the pipe of the Golden Plover, whilst on the small islands the clamour of the Oyster-catchers is sometimes deafening. But it is needless to notice birds which are to be found elsewhere; and those who wish to have more particulars of the species which frequent the Shetlands, both in summer and in winter, should consult Dr. Saxby's book, or, better still, his notes in past numbers of this Journal.

It is frequently supposed that a naturalist is of necessity a destroyer of life, and that under the plea of the requirements of science he frequently indulges in wanton slaughter. This reputation may be deserved by some, but unfortunately all who take an interest in Natural History suffer for it, and then, after visitors have left, names are mentioned, and loose statements made about their doings, which are sometimes exaggerated and often untrue. I know such assertions have been made about a friend of mine from the North Country, who was up there last May; and, therefore, I take this opportunity of saying that during the whole of my stay in Shetland I never took, or caused to be taken, the life of any wild bird whatsoever.

ORNITHOLOGICAL NOTES FROM NORTH LINCOLNSHIRE IN THE AUTUMN OF 1879.

BY JOHN CORDEAUX.

THE Whimbrel is amongst the last of our shore birds to leave in the spring, and the first whose note we expect to hear on the return journey of our autumnal migrants. I heard the familiar call-note, "tetty, tetty, tetty—tet," when in church on Sunday morning, July 27th. On the 28th there were half-a-dozen in the marsh, where they remained about the same field for a few days, and on the 31st were joined by some young Curlews. They likewise passed over on several other days during the season, noticeably on the night of August 12th, heard when at sea off Bridlington; and again on the 14th and 15th, daytime, wind S.E. to S.W., across this parish; all the flocks invisible, from the great

height at which they travelled. Once more, on September 3rd, they passed over in some numbers; last heard on the 16th.

On August 12th, when so many of our countrymen were studying the habits of the Red Grouse and the best means of approaching him, I was off the Speeton Rocks in a yacht; fishing was the ostensible occupation, and although we hauled in the codlings and gurnard quickly, there was time to look at the sea-birds. There were Guillemots and Puffins innumerable, Kittiwakes, Common and Arctic Terns, and some Lesser Terns. We did not, amongst all those thousands of birds on the water and passing us, see a single Razorbill. Is the Razorbill dying out at Flamborough? I can remember the days when it was very numerous there. The Puffin and Guillemot had young still on the cliffs, for the latter often passed with a small glittering fish held crosswise—probably a young whiting—and the former had a regular fringe of sand-launce dangling from their formidable beaks. This day we were much struck with the enormous number and variety of *Acalephæ* which drifted past, from great fellows as big as parasols, raw and bloody-looking, reminding us rather too forcibly of a freshly-scalped head, dragging pink tentacles yards in length, to little transparent, delicately fringed cups and thimbles, with four pale blue or pink spots near the apex, shoals of which go yawning and gaping past in the most indolent fashion. Our lines, of which we had a great many out, constantly became fouled with the gelatinous tentacles of these creatures, turning the water into a sort of soup, and making it quite impossible to fish, for I soon found that with the least particle of this jelly-like matter on the bait, even the greedy Gurnard refused it. Fish seem to dread coming into contact with the tentacles, at which I do not wonder, having yet a vivid recollection of the irritation caused, after clearing one of the lines, and rubbing my eyes with my wet fingers.

On August 23rd and 24th I noticed many of our smaller migrants in the Humber marshes,—Wheatears, Sedge-birds, Reed Warblers, Yellow Wagtails, and Whitethroats,—these all pass on their way very quickly, here one day and gone the next.

On September 5th great flights of Lapwings and Starlings. On the 12th—hazy, 9.30 A.M.—I saw a flight of Martins, with some Swifts amongst them, from N.E. to S.W., about three hundred feet high; they passed quickly, going at full migratory

swing. The migration of Swifts up the east coast has been very remarkable. According to a correspondent of 'The Field,' they were seen on the 20th August between the Tees-mouth and Redcar, flying about in thousands, and again on the 27th were so numerous that "the air seemed alive with them, and boys in the streets were striking them down with whips." Mr. Inchbald, writing in the same paper the following week (Sept. 13th), says that on August 25th, when at Flamborough, "hundreds of Swifts, in one continuous flight, came flying from the north over the headland towards the south. The flight continued for nearly half an hour, and the birds flew lazily on, as though they had journeyed for some distance." At Spurn they were seen in most unheard-of numbers until the 29th of August, on which day they departed. When birds are once moving they are too restless to remain long in one locality, often only for a few hours; and in the Lincolnshire marshes, unless we are out at a very early hour, we know little of what is really going on.

The night of Saturday, September 14th, was very dark, with heavy rain from S.E.; the morning of the 15th bright and fine. At 8 A.M., when dressing near the open window looking into the garden, I noticed the shrubs close to the house full of small warblers which had come in during the night—Blackcaps, male and female (rare birds in this district), the Common and Lesser Whitethroat, and numerous Willow Wrens. I thought of Herr Gütke's garden, far away in Heligoland, under similar circumstances. After breakfast, about 9.30, I took my binocular to look up a very yellow Willow Wren, showing an unusual amount of this colour on the wing-feathers, a conspicuously different bird I had seen from the window amongst the others in the bushes. Not a bird, however, except one female Blackcap, could I find in any part of the garden or adjoining shrubberies; they had stopped, rested, and gone forward again.

On September 19th, about 8.30 A.M., I pulled up for a few minutes at the entrance of one of our fields to watch a flight of Martins, two to three hundred; some were careering in full flight in and out between two ash trees, others perched on these trees, and scores on the adjacent field round a little pool of rain-water. Very pleasant it was to see their graceful evolutions, as now one and now another dashed within a few feet of my head, the whole flock keeping up an incessant low twitter or warbling, as much as

to say, "we have broken up our summer quarters, and are off for the winter amidst the eternal green of the tropics." I thought of boys breaking up for the holidays, and felt that small birds, like small boys, had their special seasons of exuberance and high spirits. On passing this place ten minutes later I was surprised to find the Martins had gone; their sudden departure struck me so much that I kept a look-out during the day for Martins in the vicinity, but saw none excepting a few pairs of local birds. Some Martins and Swallows remained with us to the end of September and early in October. On the 29th a single Martin was seen flying about, not migrating, at Easington, near Spurn.

On September 16th, W., fine and bright, I heard both Green-shanks and Whimbrels passing over; the former at 12.30 P. M., the latter at 5 P. M. On the 17th I saw twelve to fourteen Yellow Wagtails together. There were really more than that number, perhaps double, but, like the Irishman's pig, their flittings to and fro were so rapid, searching the stubbles, or hawking for insects from the "stook" tops, that I could not readily count them. On this day I also heard Redshanks calling on the "flats," and put up numbers of the first migratory Thrushes by riding down a furrow from one end to the other of a thirty-acre field of beans. Thrushes, Blackbirds, Whitethroats, and many of our smaller migrants are very fond of resorting to the shelter of bean-fields on their first arrival in the autumn. It suits them admirably for concealment in these treeless plains; they also obtain an ample supply of food in the variety and number of insects, which may be always found in such situations. On the east coast, if you wish to obtain rare immigrants, search the bean-fields.

On September 18th I shot several young Knots from flocks on the muds, and, contrary to what we might expect, found them very thin and poor. In 'The Zoologist' for November, 1879, Mr. J. H. Gurney, jun., makes nearly the same remark about Knots shot on the Norfolk coast in September—that they "were like skeletons, having no fat at all upon them." Old birds which I shot on the Lincolnshire coast on October 31st were, on the contrary, very fat and in high condition. The young Knots migrate in September, fully six weeks before the old birds; that they should be in such poor condition is quite exceptional. There is a reason for everything if we can only find it out, and it may be that for some seasonal cause, such as the lateness and scarcity of

insect-life in high northern latitudes, the young Knots did not get a sufficiency of food before migrating. The old birds, remaining six weeks later, might come in for a better supply; hence the difference of condition.

Wheatears (old birds) were very numerous represented in the marshes on the 20th September, and on the 24th Willow Wrens. In mentioning such and such birds seen at particular dates, I refer to special numbers over and above local residents. On the 26th there was an old Gannet inside the Humber—that is, within the “Bull” Light-vessel. I mention this as it is the only Gannet I have known to come within the mouth of our river. Scores of Starlings on the 27th, in the early morning, were hawking like Martins over this village; they appeared to be all young birds. Quails bred on Cabourn Wold this summer, and I am informed that some were shot early in the autumn.

Hooded Crows came in considerable numbers on or about the 20th October; wind N.W. at the time. Grey Wagtails were both seen and heard on the 21st, and the first flight of Snipe appeared to have arrived about the same time. On the 29th there were some large flocks of Greenfinches, young Linnets, and some Twites.

Mr. W. Eagle Clarke, of Leeds, to whom I am indebted for very interesting notes taken at Spurn from October 29th to November 3rd, says that on October 30th “Redwings were coming in from the sea in small numbers; some yesterday; all had left on the 30th; one seen on the 31st.” I did not see any on this side of the water before November 5th. In ‘The Zoologist’ for November last (p. 460) Mr. J. Backhouse, jun., mentions circumstances which make it probable that a pair of Redwings nested near York in 1879. From the cold, backward, and winter-like character of the spring and summer, this is by no means improbable. Redwings were observed very late in the spring on the Yorkshire coast.

On the night of October 30th, wind fresh from N.E., and drizzly rain, there was a large arrival of Woodcocks on the coast of Holderness and Lincolnshire. Mr. Bailey informed me of a large flight at Flamborough. At Spurn, on the morning of the 31st, sixty were obtained, Mr. Clarke says, to his knowledge, and probably many more; some were so exhausted as to be knocked down with sticks, and one was caught by a dog. On the

Lincolnshire coast also, between Tetney and Skegness, numbers were shot on the same morning. It must have been a very bad passage for the birds, as they appear to have reached land in a thoroughly exhausted state; how many failed to do so we shall never know. Mr. Clarke writes, "A large codfish was taken at Spurn on the 30th, which when opened was found to contain an entire Woodcock."

I saw the first Short-eared Owl in the marshes on the 30th October; twelve were seen at Spurn on the same day. A beautiful variety, shot by Mr. Clarke, had the tawny ground colour of the typical bird represented by almost pure white: it was a male. I have not seen a single Gold-crested Wren on the Lincolnshire coast during the autumn. Mr. Clarke says on the Yorkshire side the only three seen this season were in a garden at Kilnsea, on the 25th and 29th October.

All the *Turdidæ* have been remarkably scarce, more particularly the Blackbirds; the hundreds which usually at this season appear suddenly in the marsh hedgerows have only been represented by a few dozen. Speaking of Blackbirds at Spurn on October 30th, Mr. Clarke says, "Arriving singly, quite done up; they would sit at your feet among the bents and simply look up at you." Blackbirds on their first arrival will drop in the first shelter or hedgerow they find; but, like all other migrants, they are soon off again; to see them we must be near the coast soon after daylight. In some years the numbers I have seen at early morning in a single hedgerow have fairly astonished me. Many a morning, in former years, can I recall, foggy and still, yet in a few hours changing to one of those lovely cloudless latter autumn days, neither too hot nor too cold, when all Nature seems preparing for the sleep of winter. At the early hour we are out, however, the mist conceals nearly everything except the nearest hedgerows — hedgerows never more beautiful than at present, unless we choose to except a few brief days in the later spring, when they become rolling waves of bloom, above the green level of the marsh, white from base to crest with the sweet-scented "May" blossom. Now each lingering leaf is gay with autumn tints, running through many shades of yellow, brown and scarlet. The heavy dew has condensed in crystal drops on each point of vantage, and the dripping clusters of haws glisten like so many carcanets of coral. Turning through the hand-gate into the

meadow you find the "eddissh" grey with the fallen gossamer, each slender thread of which is strung with pearl-like globules of clear water, through which the dark green tracks of the hares are as readily to be seen as in new-fallen snow. Along the lee side of the fence early frosts and winds of the equinox have laid down, for several yards in width, a brightly variegated carpet, and as the dead leaves rustle under the horse's feet, the Blackbirds take alarm. You may have ridden down that hedgerow on the previous morning without seeing any, but hundreds have come across during the night, and you can hear their "quilt, quilt" and the winnow of wings as they fly out, mostly on the offside of the shelter. Before you have ridden far probably a hundred or two have been disturbed; every yard of the hedge appears to contain them. Many flit for short distances and enter the hedge, again to fly out and repeat the same process, so that when you near the termination of the hedgerow they go out by the dozen, like Pheasants from a hot corner in a preserve. Some skulk round the corner into the cross fence, whilst the more adventurous cut off the angle of the meadow. Many never attempt to fly out, but trust to the depth and thickness of the bullock fence. On horseback you may look into the black, bead-like eyes of the bird as he sits perfectly motionless at the distance of a few feet. Four-fifths of the Blackbirds you will find are young cocks. If especially fortunate you may see a Ring Ouzel, or at least hear its alarm note—a note at once distinguishable to a good ear from the Blackbird's, but not easy to render on paper.*

Like all the rest of their kind, these immigrant Blackbirds are great skulkers; never more so than for a few hours after they have come in, for they are then tired and reluctant to move. Were they Redwings we should see them perched on the outer branches, conspicuous by their light eye-streak and the dash of orange-red below the wing. Fieldfares, too, on such a morning would crowd the highest twigs, and long before seeing them we should hear their harsh but welcome chatter. On other mornings none of these birds could be found, but instead flocks of

* On November 29th, when crossing the high wolds, I rode for some distance along a hedgerow bordering one side of a large sheep-walk, disturbing numbers of Blackbirds and Redwings feeding on the haws. They flew out just as I have described, entering again the fence at short intervals. At the termination of this hedgerow the Blackbirds went out by dozens into some ash trees. Every one of these Blackbirds was, I believe, a cock.

Greenfinches or Chaffinches, or numbers of the fragile but hardy little Goldcrest clinging to the naked boughs, or searching the depths of the thicket, as if the passage of six hundred miles of salt-water was but an ordinary and everyday occurrence. Such is one of our marsh hedgerows near the coast in the migratory season.

At Spurn, on October 29th, Mr. Clarke saw a flock of Snow Buntings, and understood they had been seen the day previously; they were much more numerous on the 30th, and still more so on the following day. We saw a flock at Tetney, on the Lincolnshire coast, on the 31st. On November 4th a single flock in one of my stubbles numbered from four to five hundred; and on the 6th there were several flocks, from two hundred to four hundred and five hundred, in all the stubbles near the river.

The first Jack Snipe was seen here on November 11th. On the 12th, during a walk along the "beck" for four or five miles I saw so many Bullfinches, over and above any local residents we have, that I am inclined to think they must be immigrants. Some were remarkably fine and handsome birds. It is worth recording that on November 22nd, sharp frost,—the ground indeed frozen "as hard as a stone,"—in riding across Riby Park, at the foot of the North Wolds, I found examples of both oak and elm, big trees, in full green leaf; other trees of the same kind in the park had nearly lost their leaves, and appeared in the livery of autumn.

Large flights of various small birds came in on or about the 25th November, more particularly Greenfinches, Linnets and some Tree Sparrows. The Linnets were old birds. I got four very interesting examples from one flock, showing the gradual change through various stages to winter plumage. As a rule, all our shore birds have been unusually scarce, unless I except the Sanderling and Knot. Of the former, at Spurn, Mr. Clarke says, "In larger flocks than I have ever before seen them; very numerous." I saw immense flocks of Knots on the Lincolnshire coast on October 31st.

A most remarkable feature of the past season has been the large flight of Skuas along the east coast. They have "hugged the shore" this year in their autumnal cruise south much closer than is generally the case, having probably been driven in by a succession of heavy gales, and consequently attracted more

attention. A correspondent of 'The Field' (Nov. 1st) notices the unusual numbers of Pomatorhine, Richardson's and Buffon's Skuas seen along the Durham coast. On October 14th, also on the 15th and 17th, some thousands appear to have passed in small parties of seven or eight together during the three days, the bulk of them being adult birds. From Flamborough Mr. Bailey writes, "We have had more Skuas this year than I can remember, with the exception of 1872 and 1873, when I saw them flying in flocks of from twenty to thirty." Great numbers were seen off our Lincolnshire coast in October close in shore or on the sands, and numerous examples were shot, finding their way to the bird-stuffers and game dealers. One Pomatorhine I examined had the fully-developed tail and was an old bird, but entirely dark in plumage. On the Norfolk coast, as Mr. J. H. Gurney, jun., informs me, they were equally numerous, and many had fallen to the local gunners, the bulk of them being Pomatorhines.

So far I have heard of no Bramblings having been seen either in Lincolnshire or Norfolk. Writing from Essex, November 20th, Major Russell says that when off the mouth of the Blackwater River on the 16th, wind northerly, about twelve Bramblings passed his boat, flying N. by W. or N.N.W off the sea towards the nearest high land visible, Mersea Island. They were near enough to show the tawny bars on the wing.

After a fine and dry November with the commencement of December, as a lion at one bound, the winter has sprung upon us. The frost on December 2nd, at 7.30 A.M., was so intense as to freeze water in my bedroom shortly after having been poured out, and buckets of water taken from the springs in the yard froze almost instantly. In the afternoon I went to try for a Snipe in the marsh; the drains were frozen hard enough to bear my weight anywhere, and I found the Snipe had collected at the little pools made by the dripping from the under-drains. My first shot killed a Snipe, but also aroused about one hundred and fifty wild geese which were resting on the grassland near the Humber, and shortly after this another lot of sixty-five came nearly within shot. From each field came the mellow twittering of the Snow Buntings, and amongst the rough grasses and reeds on the drain-banks, searching for snails, were numbers of those dark "Hebridean" Thrushes whose occasional visits to us in severe winters I have before remarked upon. I also saw the largest flock of Golden Plover it

has ever been my fortune to come across. I have seen extended lines crossing our marshes and covering half a mile from flank to flank; but these were massed together, covering a very considerable space near the centre of a twenty-six acre field, very rough, and recently steam-dragged. I fear I should be accused of exaggeration were I to attempt to compute their number. I know when they arose I could not see daylight through them. They broke up into three large divisions, one of which gave me a raking shot at their right wing as they swept past at a distance of sixty to seventy yards—unfortunately too scattered to do much execution, and I had only No. 7 in my cartridges. I thought seven fell, but only picked up five, the ground being much broken and the light deficient. These five birds were like lumps of butter, weighing a trifle under forty ounces, or nearly eight ounces each, but one of the five was much lighter than the rest and spoilt the weight. Previous to this I had hardly seen a Golden Plover during the autumn. The next morning (Dec. 3rd) I got fourteen, probably forming a portion of the great migratory flock seen on the previous evening. The stomachs of several examined did not contain a particle of food, only small stones, fragments of quartz and felspar.

ON THE OCCURRENCE OF THE DEAL-FISH ON THE NORFOLK COAST.

BY THOMAS SOUTHWELL.

ON the 8th October a Deal-fish, or Vaagmør (*Trachipterus arcticus?*), was taken by some fishermen in a draught-net in Holkham Bay. After being shown in the neighbourhood for two days it was purchased by Mr. A. J. Napier, of Holkham, and sent to Mr. Cole, of Norwich, to be preserved, to whom I am indebted for the opportunity of examining it. When received by Mr. Cole it was in a very dilapidated condition, and having been so long out of the water required immediate attention. Consequently I did not see the fish in the flesh; I therefore quote from a description of it kindly given me by Mr. Hugh Robert Rump, of Wells, by whom it was seen very shortly after its capture.

Mr. Rump says, in answer to my inquiries:—"The fish in question was brought for my inspection and identification by the

captors about two hours after it was landed. It was perfectly uninjured, and presented a singularly brilliant and silvery appearance, its skin nearly resembling silver-foil; it lived about ten minutes after its capture. It measured fifty-three inches in length, and ten inches in depth at the widest part, and was perfectly flattened; one inch in thickness. The silvery sheen of the skin disappeared more or less towards the dorsal fin, and a bluish black shading took its place; but I am quite certain there were not any black spots or markings on the body of the fish—at least, on the side (the right) which I had the opportunity of observing. The dorsal fin ‘rose gently’ from the back and extended nearly to the tail; it was one continuous appendage, and not broken up into irregular portions,* and there was no kind of anterior dorsal fin.† The fin was of a most marked and beautiful colour, which may be reproduced by giving a band painted with vermilion a glazing with crimson-lake; the colour of arterial blood might be taken as a fair resemblance. There was a small fin at P of your drawing,‡ and two singularly rounded fins at V (ventral). The distance of the vent from the head was unfortunately not measured, but it was close to the gills. The caudal fin was placed eccentrically, as in your sketch; this remarkable configuration was specially noted at the time. The fish figured in Couch’s ‘Fishes of the British Islands’ is not the fish caught by the Wells fishermen, in my humble opinion.§ There was a most remarkable arrangement of elastic tissues about the muzzle and buccal cavity permitting easy and extensive elongation of the snout and mouth several inches, and possibly of dilatation also.”

When I first saw the fish, or rather its skin, the colour was quite gone, and all the beautiful silvery pigment, which readily detached itself on handling, was rubbed off the body. The delicate membrane of the dorsal fin, which was four inches high in the centre, had given way between the spines in several places, producing the appearance presented in Fleming’s figure; it had also become detached along the margin of the back, leaving a

* As shown in Fleming’s figure, *Mag. Nat. Hist.* vol. v., p. 216.

+ See Couch’s figure, vol. ii., p. 246, where the front portion of the dorsal fin is shown as separated and more elevated.

‡ Pectoral; referring to a sketch of Yarrell’s figure sent in my letter.

§ Mr. Napier expresses the same opinion.

half-moon shaped space between the base of one spine and the next. This was doubtless the result of the drying of the membrane, as it was not noticed by Mr. Rump when the fish was in a fresh condition. The process shown at *b* in Fleming's figure was certainly not present in this specimen.

The caudal fin was too imperfect to give any indication of its form. Its remains consisted of seven broken spines, three inches long, directed upwards. The ventral fins mentioned by Mr. Rump had disappeared. The "furrow," mentioned by Fleming, at the top of the head was conspicuous; but the "elastic tissue" had quite dried up on the head, leaving the plates, to all appearance, bare. The soft parts were destroyed before I saw the fish, but Mr. Cole tells me that it was a male. The contents of the stomach consisted of a small quantity of slimy fluid. The bones were very soft, and the flesh also very soft and white. The skin was exceedingly delicate and devoid of scales.

This description agrees with that given by Mr. Edward of the Banff specimen (Zool. 1879, p. 221), except that he notes the absence of both caudal and pectoral fin, which doubtless arose from the mutilated condition of his specimen. The base of the pectorals is very small, and the skin and flesh so delicate that the attachment would be very slight. That the peculiarly shaped ventral fins mentioned by Mr. Rump also escaped his attention is not surprising, as in the Holkham specimen, when it reached Norwich, Mr. Cole tells me he observed no trace of them.

Mr. Cole differs from Mr. Rump as to the situation of the vent, which the latter gentleman places "close to the gills," whereas Mr. Cole, who skinned the fish, assures me it was about two-thirds of the length of the fish distant from the head. I had no means of verifying this when I saw the skin. The Belfast specimen (Zool. 1875, p. 4343), which was washed up at Bundoran, on the southern shore of Donegal Bay, greatly exceeded the one now recorded in size, being seven feet nine inches long, but whether it differed in other respects, the brief notice given of it affords no means of forming an opinion. Mr. J. H. Gurney, jun., tells me that he saw a Deal-fish a few years ago at Teesmouth, but is not aware whether it was recorded.

It is much to be regretted that the specimen now under notice was not seen by a competent ichthyologist. Had it been immediately forwarded in a fresh state by the fishermen to

Dr. Günther, as suggested by Mr. Rump, the doubt as to the existence of one or more species of this fish would have been settled. The absence of the anterior elongated rays of the dorsal fin, position of the vent, the great disparity in size, and the absence of the two blackish spots mentioned by Dr. Günther, seem to indicate that such is the case.

OCCASIONAL NOTES.

PINE MARTEN IN IRELAND.—The Pine Marten is, I think, very much rarer in Ireland than it used to be, owing I presume to the war waged against it by gamekeepers and others. About eight years ago a specimen was trapped with a broken leg at Avondale, County Wicklow. I had it sent up to the Zoological Society, but it died on the journey. A gamekeeper killed one about fifteen years ago at Luggielaw, in the same county; and those are the last I have heard of from that neighbourhood. It still occurs in Donegal (I saw one at Glenalla last year), though in decreasing numbers, and is invariably known by the name of "Madaidh crainn," not "Cat crainn" (a name which I never heard). "Madaidh crainn" means "tree-dog." Whether tree-cat or tree-dog is the better name is another question.—HENRY CHICHESTER HART.

EXTRAORDINARY ARRIVAL OF SKUAS ON THE YORKSHIRE COAST.—A most remarkable flight of Pomatorhine Skuas took place on this part of the north-east coast on the 14th and 15th October—an occurrence which I imagine has not before been known, at least I have not met with any account of a similar visitation. During the month of September an unusual number of Richardson's Skua were observed in the Tees Bay and neighbourhood, and as many as forty or fifty were shot, to my knowledge. Great numbers of Terns also visited the Bay, following the shoals of sprats and small herrings. On the 6th October, while off in a boat, I obtained three Pomatorhine Skuas, one adult and two immature, and saw about fifty others not near enough for a shot. On the 13th I procured another immature specimen in the Tees. On the same day an adult bird was shot by a Redcar fisherman, and brought by him for my examination; but the next day, the 14th, I witnessed a most marvellous irruption of these birds. About 11 A.M. a gale from the north, changing to north-east, with heavy rain, began to blow with great violence, and soon after noon the first flight of Pomatorhine Skuas made their appearance, coming from eastward and

seaward and flying north-west, many being driven inland by the force of the gale. Their numbers increased as the day wore on, until by dusk I am sure several thousands must have gone past, and at least a hundred and fifty were shot in this neighbourhood alone. I had twenty-three in the house at once; a birdstuffer at Marske, twenty-five; another at Middlesborough, about twenty; besides dozens which were shot and plucked for the sake of the feathers. Had the local gunners known the value of these Skuas, there would have been many more killed, for the birds were remarkably fearless, or rather, I should say, ignorant of the effects of the gun, flying within a few yards of the shooters who were stationed on the sandhills to the east of Redcar. I myself several times walked to within ten yards of birds sitting on the sands; they appeared perfectly unconcerned at my appearance, and only flew off when I almost touched them. These Skuas flew in small parties of from seven to twenty in number, and the majority of them were adult birds, their long tail-feathers and white breasts rendering them conspicuous and easily distinguishable from the dark-plumaged immature birds. Amongst the Pomatorhine Skuas which I obtained were two birds entirely black; the tail-feathers were about three inches long, legs black, and bills exactly similar to the old birds. Were these old or young birds? A few of Richardson's species flew with the Pomatorhine Skuas, but not more than one in fifty. But a rarer bird than the Pomatorhine made its appearance on the 14th, in the shape of Buffon's Skua: five adult specimens were shot between Marske and Redcar; and on the 15th I obtained a pair of adult birds in splendid plumage, their tail-feathers being especially beautiful; another, also adult, was shot opposite Redcar on the 16th. A great many Pomatorhine Skuas continued to pass on the 15th, and several more were shot. On the 16th I did not see any; but on the 17th the gale freshened, and at the Tees-mouth I saw about fifty in small bands of seven or eight, and one adult bird was shot. Since that day I have not seen or heard of a single example, and it would seem that they have made their last appearance for the season. In whatever way this flight may be accounted for, it is certainly a most extraordinary occurrence, and one not likely to happen often. I should be glad if any of your readers can furnish some explanation of it.—T. H. NELSON (Redcar).

POMATORHINE SKUAS IN SOMERSETSHIRE.—It may be worth while to record the appearance of several of these birds on our coast last autumn, for although tolerably common as autumnal visitors to the south coast or Devon, especially about Torbay, they seldom make their appearance in this county. The first I heard of was on the 17th October, when I received one which had been killed at Weston-super-Mare on the same day. It was a fully adult bird—perhaps I ought to say an old bird, for the throat and breast were white, with only a few dark spots on the breast; the back of

the neck between the dark brown cap and the back was also white, both the sides and the back of the neck being much washed with yellow; there are no white marks on the feathers: the legs and feet are black. The two central tail-feathers, unfortunately, were shot away at nearly the same length as the other tail-feathers; so I had no opportunity of seeing how much they projected, which I regret, for apparently they projected considerably. This bird had not quite completed its moult, a few of the worn feathers still remaining in parts, and the primary quills and tail were all clean moulted. I mention these particulars as it is not very often an opportunity is afforded of examining such a fully adult example. Soon after this, on the 22nd October, I received another Pomatorhine Skua, which had been killed at Combwich, on the Bridgwater River, and was kindly forwarded by the Rev. C. G. Anderson, of Otterhampton. In a letter which Mr. Anderson sent me with the bird he states that he understood from William Manchip, who shot it, that there were three of these birds about the river, and that he heard that one was shot within a day or two at Steart, which is further down the river than Combwich; he also adds that the man called the bird a "Mullin Hawk," and said one had never been seen at Combwich before. This was a young bird, and, as in the other case, the moult not fully complete; the central tail-feathers, which, as well as the rest of the tail, were clean moulted, only projected about half an inch beyond the others; this may have been because they were not fully grown, but even if they had been I do not think in so young a bird they would have projected much further; the legs were blue and the feet black. Other occurrences of this bird in this county are rare. I did not include it in my 'Birds of Somerset,' as I did not then know of a Somerset specimen, but have since obtained one—an immature bird—from a birdstuffer at Taunton, which he told me was one of a pair killed at Minehead, and given to him in payment for setting up the other. I could not ascertain the exact date at which these birds had been killed. Mr. Poole, of Brent Knoll, also informs me that he has an immature bird, bought fresh-killed in Bridgwater; so that, after all, Mr. William Manchip may have made a mistake in supposing his was the only "Mullin Hawk" ever seen dead at Combwich, as in all probability Mr. Poole's bird was killed somewhere about there. These are all the occurrences of the Pomatorhine Skua in Somerset of which I have yet heard.—CECIL SMITH (Lydeard House, Taunton).

POMATORHINE SKUAS IN THE BRISTOL CHANNEL.—On October 21st I received from Instow two Pomatorhine Skuas which had been shot there. Both are fine adults, and agree with the figure in Mr. Dresser's work, with the exception that the band across the breast is much darker. The intensity of colour and the depth of this band varies greatly in adult specimens obtained at this season of the year. Two shot by me on the

same day in October on Torbay, a few years since, differed remarkably in this respect. In one bird the whole of the under parts is of a pure white; only a few specks of darker colour appear on the breast. In the other bird the chin and breast are of a brownish black, speckled slightly with white. A small flock of Pomatorhine Skuas seem to have ascended the Bristol Channel, in which waters they are of extremely rare occurrence. A birdstuffer in Taunton has received two from Minehead, one adult and one immature bird; another, a bird of the year, was sent him from North Curry, a place situated some miles inland, but looking down on the great Sedgemoor flat; and two more of these Skuas, an adult and immature bird, were sent him from a place so far up the channel as Weston-super-Mare. I noticed that the adult examples had unfortunately lost the elongated central feathers of the tail, which had apparently been shot off. In the two old birds received from Instow one had these feathers in perfect condition, while in the other one of the two feathers had been cut off by shot.—MURRAY A. MATHEW (The Vicarage, Bishop's Lydeard).

SKUAS IN YORKSHIRE.—On the 18th October a specimen of Buffon's Skua was captured on Strensall Common, near York, and brought to Mr. Helstrip, birdstuffer, St. Saviour's Place, York. It is an extremely rare bird in our county, only four or five, so far as I know, having been previously taken. It was found, half starved, on the moor, but is in good plumage and worthy a place in some museum. On the same day a male specimen of the Great Skua was shot on Tolerton Ings, near York, which I have carefully preserved. It is occasionally seen on the Yorkshire coast during the autumn and winter, but seldom comes so far inland as this. I have lately seen a Pomatorhine Skua, which, strange to say, was shot at Pocklington on the same day as the other two, and is now in the possession of Mr. Ripley, birdstuffer, Teesgate. The fact of three species of Skua, all rare on the Yorkshire coast, being taken in one day in the neighbourhood of York is sufficiently curious to deserve notice.—J. BACKHOUSE, JUN. (West Bank, York).

SKUAS OFF THE COASTS OF DEVON AND CORNWALL.—Large flights of these birds have appeared in the Channel off the coasts of Devon and Cornwall. Mr. James, of Plymouth, a yachting friend, informs me that when at the entrance of Salcombe Harbour in October he observed flocks of "Boatswain" Gulls flying down the river from the direction of Kingsbridge, and afterwards met with a great many off the "Bolt," and other headlands on the coast. Mr. Clogg, of Looe, also informed me that, on making inquiry among the fishermen of that place, they all said that they never remembered having seen so many of these birds in the Channel before, and that Gannets were also very numerous. Mr. Rodd, of

Penzance, likewise wrote me word that Mr. Vingoe, of that town, had lately had many immature specimens of the Pomatorhine Skua offered to him for sale, and I have lately heard of a small kind of Gull, in almost black plumage, having been repeatedly seen at the entrance of Sutton Harbour, Plymouth, which I have no doubt was one of the small Skuas in its dark dress. I may here mention that all the smaller species of Skua are commonly called "Lords" and "Captains" by the Devon and Cornish fishermen, "Tom Hurry" being also a local name; but the Great Skua (*Stercorarius catarractes*), now unfortunately so rare on our coast, generally goes by the name of "Old Hen."—J. GATCOMBE (Durnford Street, Stonehouse).

ORNITHOLOGICAL NOTES FROM LOWESTOFT. — From its geographical position there ought to be few better places for observing the southward migration of birds in the autumn than Lowestoft, which juts out into the sea, and is the easternmost point in England. Having spent most of October there, I had many opportunities of noting, as another correspondent seems to have done at Harwich (Zool. 1879, p. 459), the arrivals of Larks and Rooks, which often come over in large numbers. It is singular how little rule there is in their movements, to our eyes, several days often passing without any arrivals, and then comes a day when they drop in every quarter of an hour, not in ones and twos, but in flocks fifty or sixty strong, flying comparatively low over the water, the birds passing on inland as if they knew no fatigue. The remarkable migration of Skuas, which has been observed on the Norfolk coast, if it extended to Lowestoft, did not come particularly under my notice, although one day, off the end of the pier, I saw a Skua (I think Richardson's Skua) chasing some Terns; but the numerous examples which occurred in Norfolk are nearly all Pomatorhines, mingled with adult Buffon's Skuas. As the Terns had long left Blakeney, in Norfolk, I was surprised to see numbers in and around the harbour, and they remained at Lowestoft until about the 24th of October. I had an opportunity of examining one of them, and it proved, as I expected, to be the Arctic Tern. Common and Herring Gulls were abundant; and a Little Gull was shot on the 24th, the only one I have heard of on our coast. I explored Lakes Oulton and Lothing for Grebes; but I suppose they had migrated, for the only Grebe I saw was a Dabchick hanging up in a shop with a few Ring Dotterels. At Fritton Lake, however, a splendid piece of water a few miles from Lowestoft, where there are two decoys, I saw three or four Great-crested Grebes; one of them was swimming outside Lady Crossley's decoy; and a pretty sight it was amongst the different species of Ducks—Mallards most numerous, then Widgeon and Teal, and half a dozen splendid Pochards—gracefully floating on the water, with no constraint, and quite unaware that we were watching them behind the screens, while the well-trained dog dodged in and out in attempts

which were only partially successful to decoy the nearest ducks under the fatal netting. The largest number of ducks ever taken by Page, the decoyman, here at one time in a single pipe was 101, and I do not know how they all squeezed into the small tunnel-net, as it is called, at the end of the pipe. By-the-bye, one of these tunnel-nets at Fritton, hung up on a rail, served this summer for a Redstart to build in. As might be expected, the extensive woods which surround the lake are frequented by many hawks. A fine Honey Buzzard, which had been sent from Fritton to be stuffed, was shown to me while at Lowestoft, and I believe this bird has several times occurred at the lake, as also has the young of the Sea Eagle. The Sparrowhawk was evidently common, for in the course of a walk I saw three or four. About two hundred yards from the lake, at Mr. H. Buxton's house, I had good opportunities of watching a cock Black Redstart, which seemed to be very partial to a new terrace which was being built. It stayed a few days on and about the house, often approaching within a few feet of the windows, but was not seen after October 30th. Though a black male, it had no white on the wing (*cf.* 'Rambles of a Naturalist in Egypt,' p. 162). —J. H. GURNEY, JUN. (Northrepps, Norwich).

THE LARGE RUSSET VARIETY OF THE COMMON SNIPE. — The other day I received from Scilly a string of Snipes, and amongst them was a specimen of the variety known as the Russet Snipe (see Gould's 'Birds of Great Britain.') It was a female, and, although badly shot, and in condition by no means beyond the average, weighed fully four ounces and a half. The character of the plumage is precisely like those I have obtained before—*viz.* a predominant cast of rufous on the dorsal plumage, with fainter and narrower longitudinal stripes, and with the flanks much more striated than the Common Snipe. I weighed all the others and found none exceeded three ounces and a half, although in fair condition. In order to bring more immediately before one's eyes the length and shape of the tail-feathers, I have had them placed in a case in the same typical attitude, with their tails spread, for the purpose of further examination as to their specific value. There appear to be one or two points of distinction as regards the measurements, to which Mr. Vingoe called my attention on comparing specimens of each. The tertial feathers in the Common Snipe reach to the tips of the primaries when closed, or very nearly so; in the russet-coloured bird they do not reach the end of the primaries by half an inch at least. There is a difference also in the length and shape of the tail; that of the Common Snipe appears almost square at the end when spread, the outer feather being equal in length to the third, and these are the longest in the tail. The length of the whole tail in the common species exceeds that of the russet variety by at least half an inch; the tail-feathers of the latter, when spread, form a regular round,

the exterior feathers graduating and preserving the rotund sweep. The tail-feathers of the two, when seen together thus spread out, show these characters prominently; the square character of the Common Snipe's tail arises in consequence of the outer and third feathers being of equal length. Another specimen of the russet variety in Mr. Vingoe's possession, rather smaller in size, is a male; this has also the rounded and shorter tail. The only distinguishing character in the two is that the male has some of the longitudinal dorsal lines on the scapularies edged with a paler yellow, almost white, as compared with an uniform yellowish border in those of the female. Whether these characters will be found to hold good is a question which must remain open for further investigation. Since writing the above I have had opportunities, during the late severe frost, of examining a great number of specimens of our Common Snipe, and I find that I fell into an error in describing the shape of the spread tail as square when compared with that of the russet variety, and which appears from the specimens examined to have all a graduated rounded form of tail. On examining many other specimens it appears that the prevailing form is rounded, and not square; and my error arose from having at the time before me some specimens which proved accidentally to be square-tailed birds. I am convinced now that in the proportion of three-fourths, or even ten-twelfths, this rounded form is the typical form of our Common Snipe's tail, and only a few show the square tail. It will thus appear that the rounded tail of the Russet Snipe is not a distinctive character. The square-tailed examples, however (several of which I have seen and examined), have, in addition to the extended outer and third tail-feathers beyond the second feathers, and which in fact gives this square form, a greater length of tail from the roots to the extremities by from two- to three-eighths of an inch, a difference very apparent to the eye.—EDWARD HEARLE RODD (Penzance).

[The square-tailed form here referred to is probably the variety described by Kaup as *Scolopax Brehmii* ('Isis,' 1823, p. 1147). We are convinced that the so-called Russet Snipe is nothing more than a variety of the common species.—ED.

A BROOD OF WHITE SWALLOWS.—White, or nearly white, varieties of the Swallow, *Hirundo rustica*, are not very uncommon. They are generally obtained in autumn, and are almost invariably young birds. It is seldom, however, that a nest is found in which the entire brood is in this abnormal plumage. Prague papers state that Herr Hofmann, of Podebrad, in Bohemia, a well-known naturalist, has presented to the Crown Prince Rudolph a nest full of Swallows quite white. The parent birds which reared them, and which he has forwarded to the Prince, together with their exceptional offspring, have the usual colour of ordinary Swallows.—J. E. HARTING.

GREAT BUSTARD IN CORNWALL.—The following letter from my friend Mr. Clogg, of Looe, relative to the recent occurrence of the Great Bustard in Cornwall, will, I am sure, be read with interest :—" December 12, 1879. Last night, between nine and ten o'clock, I had brought to me a living Great Bustard (*Otis tarda*), for identification, as well as to inquire if I thought it could be kept alive. On looking it over I found it in a most miserably starved condition, produced, I believe, chiefly from either a wound or disease of the ankle-joint. The bird had not been shot, but was caught by a spaniel dog, by which, I believe, it was much injured, as it could not stand or make the least endeavour to escape when placed on the ground. It appeared to be in great pain, so I reluctantly recommended it should be killed, which was done, and I believe it is to be 'set up.' As you may suppose, from the exhausted state of the bird, the plumage is not in the most perfect condition, and the dog in catching it tore out almost the whole of the tail; but the feathers have been preserved, so I hope that defect may be somewhat repaired. The bird was taken on Wayland Taland, a farm about a mile from Looe. It was first observed there on December 9th, and was seen about until the day it was captured. No doubt the injury to the leg was the reason it could not make its escape from the dog. I think, from the size of the bird and its plumage, it is a female, but as I only saw it by candle-light, and had but little time to examine it, I cannot positively say." I have since had the pleasure of seeing this bird at the shop of Mr. Peacock, animal preserver of Plymouth, to whom it was sent for preservation, and from its small size and general appearance have no doubt of its being a female, as Mr. Clogg supposed, and also think with him that it could not have lived, having apparently been injured across the back, where several feathers had been lost; but it is otherwise in fairly good plumage, and the downy bases of the feathers of the usual beautiful rose colour, which, after death, soon fades to yellowish brown. Its extreme measurement across the wings is a little above five feet four inches.—J. GATCOMBE (Durnford Street, Stonehouse).

GREAT BUSTARD IN JERSEY.—A correspondent in Jersey, writing on December 9th, states that on the previous day a female Great Bustard was shot in the parish of St. Clement's by Mr. A. Messaray, of Broad Street. It weighed nine pounds, and measured three feet in length, with a wing (from carpal joint) of nineteen inches. Since then he has heard that another was killed on the same day near the same place. The two birds were observed feeding in some broccoli, and are stated to be very much alike in plumage, weight, and measurement. Possibly they may be both young birds. They are being preserved for their respective owners, and I hope to receive further particulars.—J. E. HARTING.

GREAT BUSTARD IN ESSEX.—A specimen of the Great Bustard was shot by Mr. A. Pertwee, at Woodham Ferrers, near Hull Bridge, on December 5th. This is a very rare bird in Essex, I think the first recorded. It is now in my possession, and will make a fine addition to my collection of rare birds.—C. SMOOTHY (Chelmsford).

VIRGINIAN COLIN IN NORFOLK.—On December 5th, when shooting at Northwold, near Brandon, I secured a game-bird which I never saw on the wing before—namely, a Virginian Colin (*Ortyx virginianus*). We flushed two (one of which escaped) out of a belt of broom and furze on Foulden Heath. On the wing it looked very like a miniature Red-legged Partridge, and, like it, flew very fast and straight. There is no reason to suppose that these birds crossed over from America—a feat which indeed they would be physically incapable of accomplishing, except through the agency of man. No doubt they or their progenitors were originally turned out in some other part of the county, and wandered to the spot where we found them. I have since ascertained that several hundreds have been turned out at different times by Mrs. Lyne Stephens at Lynford, by Lord Walsingham at Merton, and by the Maharajah Dhuleep Singh at Elvedon, near Thetford. The one shot on December 5th was in excellent condition, notwithstanding the severity of the weather and the apparent difficulty of obtaining food. Both crop and stomach were full of seeds of the furze. The measurements were as follows:—Total length, $9\frac{1}{2}$ inches; bill, nearly $\frac{1}{2}$ inch; wing from carpus to end of longest primary (the fourth), $4\frac{1}{2}$ inches; tarsus, $1\frac{3}{8}$ inch; middle toe, with nail, $1\frac{3}{8}$ inch nearly; expanse of wings, nearly 14 inches; weight, nearly 8 oz.—J. E. HARTING.

LESSER TERNS BREEDING ON THE WICKLOW COAST.—In reference to an observation of Mr. Cox (Zool. 1879, p. 485), I may mention that I found a small colony of Lesser Terns, about thirty or forty birds, breeding on the Wicklow coast last summer.—WILLIAM W. FLEMING (18, Upper Fitzwilliam Street, Dublin).

LARGE-HEADED COD AT THE MOUTH OF THE THAMES.—In the last published number of the 'Journal of the Linnean Society' (vol. xiv. No. 80, p. 689) is a paper by Dr. Francis Day on the occurrence of *Morrhua macrocephala* at the mouth of the Thames. This fish was captured at Southend, but died in transit on its way to London. A second example taken with it, and stated to be exactly similar, was not preserved. Dr. Day considers it to be a distinct species from the Common Cod, and possibly identical with the "Lord Fish" of Yarrell. After quoting the opinions of Dr. Cobbold (Proc. Roy. Phys. Soc. Edinb., 1854-58, vol. i., p. 51), Dr. J. A. Smith (*op. cit.*, vol. iii., p. 302), and Dr. Dyce (Ann. & Mag. Nat. Hist., 1860, vol. v., p. 366),

the last-named of whom considers the "Lord Fish" to be a Common Cod unnaturally shortened from spinal disease, he gives his reasons for differing from this view, and for regarding it as a distinct species. A full description, figure, and measurements are given of the specimen examined by him.

PROCEEDINGS OF SCIENTIFIC SOCIETIES.

LINNEAN SOCIETY OF LONDON.

November 20, 1879.—Prof. ALLMAN, F.R.S., President, in the chair.

Messrs. Winslow Jones, of Exeter, and William Wickham, of Binsted, Wyck, Alton, Hants, were elected Fellows of the Society.

The first zoological paper read was "On the Extinct Land Tortoises of Mauritius and Rodriguez," by Mr. Alfred Haddon, and communicated by Prof. Alfred Newton. The material whereon this is based is a fresh collection of remains of gigantic tortoises now deposited in the Cambridge University Museum. The author states that an examination of these bones corroborates the two Mauritian species, *Testudo triserrata* and *T. inepta*, described by Dr. Günther, but it adds no fresh example to that apparently unsatisfactory species *T. leptocnemis*. Moreover, though possessing a large series of remains from the island of Rodriguez, Mr. Haddon like Dr. Günther cannot distinguish more than one species, *T. Vosmæri*. As examples of the inherent tendency to variation in these animals, attention is drawn to the ankylosis of the coracoid with the rest of the shoulder-girdle in one specimen of *T. inepta*, a circumstance which is unique; also to the variations in the coracoid of *T. triserrata*, so as to form markings, &c. The free coracoid of *T. inepta* is also for the first time recorded. From the large number of specimens examined, it is now found that the coracoid of *T. Vosmæri* is very irregular as to the time of its ankylosis with the rest of the shoulder-girdle, and that it is not the "apparently individual aberration," as supposed by Dr. Günther. To facilitate comparisons measurements are given of all the most interesting bones in a manner similar to that adopted by Dr. Günther in his monograph. Finally, the attention of herpetologists is drawn to this Cambridge series as representing the most complete set of specimens extant of this interesting group of extinct reptiles. They were collected by Mr. Edward Newton (now Lieut.-Governor of Jamaica) when resident in the Mauritius.

The abstract of a paper "On Crustacea from the Greenland Seas," by Mr. Edward J. Miers, was read by the Secretary. Material chiefly collected by Mr. Edward Whymper in his northern cruise forms the basis of this communication; two species, however, obtained by the late Arctic Expedition

being included in an Appendix. Scandinavian and English naturalists of late years have so explored the seas in question, that great novelties could not be expected among the groups of Crustacea. Mr. Whympers dredging was chiefly confined to the neighbourhood of Hare Island, north of Disco, in about thirty fathoms of water. Here animal life abounded. Some twenty-nine species are recorded, and remarks given with reference to localities and geographical range, &c. With regard to *Crangon* (*Cheraphilus*) *boreas*, the author says that in Mr. Kingsley's opinion the genus *Cheraphilus* as defined by Kinahan cannot be maintained. Mr. Miers, however, is inclined to retain it as a sectional division of *Crangon* to those animals (or species) of large size, with median and lateral series of spines on the cephalothorax and with post-abdominal segments all keeled; thus in contradistinction to the smaller, less robust species (e.g., *C. vulgaris*, *franciscorum*), in which the parts in question are smooth. A probable new species of *Idotea* is described, the cetacean parasites *Cyamus nodosus* and *C. monodontis* from the Narwhal are referred to, and corrections added to the former account of *Brachinecta arctica*.

Mr. Thomas Christy exhibited and made a few remarks on two human skulls from natives of Australia, said by Dr. Bancroft to show a particular occipital thickening supposed to be induced by the blows of native "knobkerries."

Other communications of a botanical character were made by Sir J. D. Hooker, Mr. E. M. Holmes, and Mr. M. Ward.

December 4, 1879.—Prof. ALLMAN, F.R.S., President, in the chair.

The following gentlemen were elected Fellows of the Society:—Samuel Wright, St. Neots, Huntingdon; George Malcolm Thomson, Dunedin, New Zealand; J. Otto Tepper, Adelaide; Major Collet, Kurrum Field Force; Henry B. Spotton, Ontario; John Cameron, Botanical Gardens, Bangalore; and Sir Samuel Wilson, Ercildoune, Victoria.

Mr. W. Carruthers exhibited a bottle of Pteropods, *Spiralis retroversus*, obtained in great abundance on the surface of the water of the Gareloch, Ross-shire, July, 1879, by Dr. John Grieve. A letter from the latter gentleman was read, giving an account of some of the habits of these interesting Mollusca. They swam rapidly to the surface, rising with a perpendicular fluttering motion, and, having reached it, raised their wing-like appendages above their heads, and holding them there motionless would then drop quietly to the bottom. Some of the creatures would occasionally stop half way down and paddle their way back to the surface, again to descend as above mentioned; but seldom or ever did they swim along the surface of the water. Dr. Grieve mentions that he did not observe these Pteropods use their wings (epipodia) as feet to walk or crawl along, as Alex. Agassiz has stated to be the case.

Prof. P. M. Duncan made a communication "On a Synthetic Type of Ophiurid from the North Atlantic." The specimen in question was dredged by Dr. Wallich in the voyage of H.M.S. 'Bulldog' in 1860. On casual inspection it might be regarded as an Amphiuran, but the spinulose disk and hooked side-arms oppose this notion. Again, resemblances to species of *Ophiothrix* suggest themselves, but the large scaling of the disk, the absence of tooth papillæ, and the presence of accessory pieces around the aboral edge of the upper arm-plates are distinctive characters, and which to a certain extent are indicative of Ophiolepid affinities, but the dental apparatus does not conform. In shape and dental characters it approaches *Amphiura*; spinules and arm-hooks are those of *Ophiothrix*; and accessory plates resemble those of *Ophiolepis*. This remarkable Ophiuran was obtained at a depth of 228 fathoms, fifty miles north of Cape Valloe, East Greenland. With the difficulty of positively asserting its nearest allies, Prof. Duncan places it (*Polycophilis echinata*) provisionally among the family *Amphiuridæ*, and remarks that such forms, though rare, shake confidence in some of the recent methods of classification of the *Ophiuridæ*.—J. MURIE.

ZOOLOGICAL SOCIETY OF LONDON.

November 18, 1879.—Prof. FLOWER, LL.D., F.R.S., President, in the chair.

The Secretary read a report on the additions that had been made to the Society's Menagerie during the months of June, July, August, and September, 1879.

An extract was read from a letter addressed to the Secretary by Mr. H. O. Forbes, on the subject of the distribution of the Badger-headed *Mydaus* in Java.

The Secretary read an extract from a letter received from Dr. A. B. Meyer, in which the habitat of *Cervus Alfredi* was stated to be Samao and Leyte Islands, of the Philippine group.

Mr. E. R. Alston exhibited some mammals collected by Mr. Wardlaw Ramsay, 67th Regiment, including examples of some species new to the faunas of Burma and Afghanistan.

Mr. Alston also exhibited one of the typical skulls of *Tapirus Dowi* (Gill), which had been entrusted to him by the authorities of the U. S. National Museum. He remarked that the young Tapir from Corinto, Nicaragua, which was formerly alive in the Society's Gardens, was really an example of *T. Dowi*, and not, as had been hitherto supposed, of *T. Bairdi*.

Prof. Flower exhibited and made remarks upon the skull of a White Whale, *Delphinapterus leucas*, recently obtained in Sutherlandshire.

The Secretary exhibited, on behalf of Mr. Rowland Ward, the head of a Chamois with two pairs of horns.

Communications were read from Mr. L. Taczanowski, containing descriptions of a new *Synallaxis*, from Peru, which he proposed to name *Synallaxis fruticola*; and of a new *Myiarchus*, from the same country, proposed to be called *M. cephalotes*.

A third communication received from Mr. Taczanowski contained a notice of some birds of interest recently received from Turkestan.

A communication was read from Captain Shelley, containing an account of a collection of birds made in the Comoro Islands, received from Dr. Kirk, H.B.M. Consul-General at Zanzibar. The collection contained 186 specimens. A *Zosterops* which appeared to be new was named *Z. Kirkii*, in acknowledgment of the assistance rendered to Ornithology by Dr. Kirk.

A second paper by Capt. Shelley gave the description of two new species of African birds.

Lieut.-Col. H. H. Godwin-Austen read a description of the female of *Lophophorus Sclateri*, Jerdon, from Eastern Assam.

A communication was read from Dr. Goodacre, on the question of the identity of the Common and Chinese Geese.

A communication was read from the Rev. O. P. Cambridge, on some new and rare Spiders from New Zealand, with characters of four new genera.

A communication was read on some African species of Lepidoptera, belonging to the subfamily *Nymphalinae*, by Mr. W. L. Distant. In this paper several instances of great variation were given, and some corrections made in the nomenclature. A new genus, five new species, and the male of *Harma Lucasi*, Doum., were also described.

Mr. R. G. Wardlaw Ramsay read the description of a new Oriole from N.E. Borneo, which he proposed to call *Oriolus consobrinus*.

December 2, 1879.—Prof. NEWTON, F.R.S., Vice-President, in the chair.

The Secretary read a report on the additions that had been made to the Society's Menagerie during the month of October, amongst which special attention was called to a specimen of Elliot's Guinea-fowl (*Numida Elliotti*), received from Eastern Africa.

A letter was read from Mr. E. L. Layard, advocating the desirability of a fixed scale of colour for use among naturalists, in describing the plumage and pelage of birds and other animals.

A letter was read from Mr. R. B. White, of Medellin, U.S. of Colombia, South America, on a mode of protecting plantations from the ravages of an ant (*Atta cephalotes*).

A communication was read from Dr. G. E. Dobson, containing notes on some species of *Chiroptera* from Zanzibar, with descriptions of new and rare species.

A communication was read from Prince Ladislas Lubomirski, containing the description of a collection of shells made in High Peru, by Messrs. Jelski and Stolzman.

Mr. G. French Angas read a paper in which he gave the descriptions of two new species of *Helix* (*Eurycratera*) from S.E. Betsileo, Madagascar.

Mr. Arthur G. Butler read a paper on some Arachnida of Madagascar and the Mascarene Islands, in which an account was given of a collection of Spiders recently received by the British Museum from Réunion and Mauritius, through Mr. H. H. Slater.

Lieut.-Col. H. H. Godwin-Austen and Mr. G. Nevill gave descriptions of two collections of Land Shells obtained at Perak and in the Nicobar Islands by Surgeon-Major E. Townsend and Dr. F. Stolizka.

A communication was read from Dr. A. Günther, containing a notice of a collection of Mammals and Reptiles recently received from Cyprus by Lord Lilford.

Dr. F. Day read a paper on the Fishes of Weston-super-Mare, a locality he had lately visited in order to enquire into some species described by Yarrell and Couch as found on this coast. Mr. Day also gave some account of the results of Lord Ducie's trawling investigations in Ballinskelley Bay, on the coast of Ireland; and described a specimen of the Long Flounder received from Mr. M. Dunn, of Mevagissy, in Cornwall.—P. L. SCLATER, *Secretary*.

ENTOMOLOGICAL SOCIETY OF LONDON.

November 5, 1879.—H. W. BATES, F.L.S., F.Z.S., Vice-President, in the chair.

Mr. Stainton read two letters from Lord Walsingham, setting forth in a more detailed manner the objects which his lordship had in view in offering the prizes referred to at the last meeting through the Council of the Society.

After some remarks by Mr. Stainton, Prof. Westwood, Mr. P. Wormald, and others, the Chairman stated that the decision at which the Council had arrived might be considered as final.

Mr. T. R. Billups, of 4, Swiss Villas, Coplestone Road, Peckham, was balloted for and elected an Ordinary Member.

Mr. W. C. Boyd exhibited a remarkable variety of *Aspilates citraria*, a specimen of *Cidaria testata* in which the hind-wings were completely absent, and a *Noctua* resembling *Hadena dentina*, but differing from this species in the form of the body, taken at Ilfracombe.

Mr. M'Lachlan said he was once more compelled to bring the subject of the sculptured stones on the shores of the Swiss lakes before the notice of the Society. Professor Forel, upon seeing the notice of the last meeting in 'Nature,' had written to him, explaining at length the nature of those

culpturings according to his views. His remarks may be concisely rendered as follows:—There are three principal types of markings: (1) Where the stones are covered with chlorophyllous Algæ, serpentine furrows, the work of larvæ of *Tinodes*, occur. (2) Where the stones are covered with incrusting Algæ the markings are more numerous and meandiform, and due, as he considered, to the permanent pathways made amongst the Algæ by insect larvæ, worms, mollusks, &c., intensified by the carbonic acid expired by the animals. (3) Grooves caused by the larvæ of *Chironomus*.

Professor Westwood exhibited a series of drawings illustrating the economy and transformations of several species of Trichopterous and other Neuropterous insects, of which he gave an account; also drawings of a number of new and interesting exotic species of Heteropterous Hemiptera, allied to the genera *Syrtsis*, *Emesa*, *Rhypparochromus*, &c., contained in the Hopeian Collection, full descriptions of which he proposed shortly to communicate to the Society for publication.

Prof. Westwood next called the attention of the Members of the Society to the present condition and future prospects of the Hopeian Collection of Entomology in the University of Oxford, and of the Hopeian Professorship of Zoology connected therewith, considering that it was very desirable that, at his advanced age, entomologists should, in the interest of their science, be made fully acquainted with the extent of the Hopeian Collection, the regulations connected with the Professorship, and the modification which has been proposed by the Oxford University Commission, now sitting, which, in his opinion, would materially modify, and to a certain extent render nugatory, the intentions of the founder of the Professorship and donor of the Collection.

Prof. Westwood then made some remarks on the affinities of the genus *Polycytenes*, Westw. (Thes. Ent. plates 38, 39 and 40), which Mr. C. O. Waterhouse at the last meeting of the Society had regarded as closely allied to the *Nycteribiidae*, and especially to the genus *Strcbla*.

Mr. J. Jenner Weir exhibited some ants, apparently a species of *Atta*, which he had found in large numbers at Pisa on the lawn around the Baptistry and Cathedral. These ants did not make any hill of earth about their nests, but collected around the entrance hundreds of small empty shells of *Helix caperata* and *H. virgata*. He was unable to offer any opinion as to the object of these singular collections. The shells were so numerous and lay so closely together, that he could easily take them up by scores at a time.

Mr. Weir also exhibited a specimen of an *Orgyia* (? *antiqua*), stated, on the authority of Mr. H. S. B. Gates, to have come out of the larval skin without passing through the pupal state.

The Secretary then read a note from Mr. W. L. Distant on some Hemiptera from India.

The Secretary also exhibited, on behalf of Dr. Fritz Müller, a photograph of a curious dipterous insect.

Dr. F. Buchanan White communicated Part I. of a "List of the Hemiptera collected in the Amazons by Prof. J. W. H. Trail in the years 1873—1875."

Mr. Frederick Bates communicated "Descriptions of new Genera and Species of *Tenebrionidæ* from the Island of Madagascar."

Mr. C. R. Waterhouse read "Descriptions of new Coleoptera from East Africa and Madagascar," and exhibited specimens of the new species.

Mr. A. G. Butler communicated a paper "On the Natural Affinities of the Lepidoptera hitherto referred to the Genus *Acronycta* of Authors," from an examination of the characters chiefly of the larval stage. In illustration of Mr. Butler's paper, Lord Walsingham had lent for exhibition his collection of preserved larvæ of this genus.—R. MELDOLA, *Hon. Sec.*

NOTICES OF NEW BOOKS.

Observations on the Fauna of Norfolk, and more particularly on the District of the Broads. By the late Rev. RICHARD LUBBOCK, M.A., Rector of Eccles. New Edition, by THOMAS SOUTHWELL, F.Z.S. With a Memoir, by HENRY STEVENSON, F.L.S.; and Notes on Hawking in Norfolk, by ALFRED NEWTON, M.A., F.R.S. 8vo, pp. 239. Norwich and London: Jarrold & Sons. 1879.

THIRTY years having elapsed since Lubbock's 'Fauna of Norfolk' appeared, and the first edition having been long out of print and scarce, no apology seemed needed for the preparation of a second edition. The book in its original form is well-known to naturalists, and it would be difficult to find another volume of its size which conveys in so agreeable a manner so much accurate and trustworthy information on the subject of which it treats.

Lubbock's long residence in the district of the Broads, combined with rare powers of observation, especially fitted him to write authoritatively on the natural history of a county with which as a sportsman and a naturalist he was so well acquainted. Hence his 'Fauna of Norfolk' has long been regarded as a text book by those who have wished to inform themselves on the physical aspect of the county before drainage, cultivation, and the introduction of railways wrought so complete a change in it, and

on the abundance and variety of its furred and feathered inhabitants before the misguided zeal of game-preservers, and the unceasing persecution of gunners, exterminated many interesting species, and thinned the number of the survivors.

"Since first I began to sport, about 1816," writes Lubbock, "a marvellous alteration has taken place in Norfolk, particularly in the marshy parts. When first I remember our Fens, they were full of Terns, Ruffs, and Redlegs, and yet the old fen-men declared there was not a tenth part of what they remembered when boys. Now, these very parts which were the best have yielded to the steam-engine, and are totally drained; the marshes below Buckenham, which, being taken care of, were a stronghold for species when other resorts failed, are now (1847) as dry as a bowling-green, and oats are grown where seven or eight years back one hundred and twenty-three snipes were killed in one day by the same gun. The Clacton marshes, which formerly were almost too wet, are now as dry as Arabia."

Mr. Southwell, in his Introduction, supplements these observations with more recent information, and dwells at some length on this section of the 'Fauna,' for, as he justly remarks (p. ix.), the chief value of a new edition of an old work on such a subject is to show the changes which have taken place in frequency and distribution of species, and to offer such explanations of the changes indicated as the writer may consider probable.

Of the Mammalia there is little to be said. The larger species, which are not considered useful to man, or have not been protected for sporting purposes, have, with one single exception, long since disappeared. This exception is the Otter, which, in the native fastnesses of the marshes and reed "ronds" which fringe the Broads, still continues plentiful, and is likely to remain so. The Bats have not yet received the attention they deserve, and would doubtless repay closer study by the addition to the local fauna of more than one species not at present recorded as occurring in the county. The greatest additions to the Mammalia have been made in the *Cetacea*, the five species enumerated by Lubbock as occurring on the Norfolk coast having been increased to nine (p. 15), concerning which Mr. Southwell has some valuable notes.

By far the greater portion of the book is occupied with an account of Norfolk birds, to which Lubbock paid special

attention, and his descriptions of many of the species as observed by him in their natural haunts are so vivid and life-like as to make a modern ornithologist regret that some of the scenes depicted are no longer to be witnessed. We abstain from quoting any of these descriptions, since it is difficult to make a selection, and content ourselves with promising to those who have never yet read this book a rare treat from its perusal.

One of the most interesting chapters in the whole volume is that on the remains of Falconry in Norfolk (pp. 33—44), and evinces the many sources, both ancient and modern, from whence the writer's information was derived. This has been supplemented in the present edition by a chapter entitled "Hawking in Norfolk" (pp. 224—239), written by Professor Newton, who, from the fact of Elveden Hall, near Thetford, having been his home in early life, together with his close intimacy with the late E. C. Newcome (whom Lubbock regarded as the most accomplished falconer of his day), enjoyed peculiar advantages for becoming acquainted with the circumstances under which this ancient sport declined, and finally ceased to be followed in the county. In this Appendix also will be found a brief account of the Reptiles, the rarer Sea Fishes, and the Lepidoptera of Norfolk, together with some remarks on the Botany of the county. These subjects, although not originally included in the scope of Lubbock's work, have been judiciously added by Mr. Southwell, in order to render the volume more complete.

An excellent memoir of the author (pp. xiv—xxviii) is furnished by Mr. Stevenson, whose own acquirements as a naturalist and taste as a writer have enabled him to contribute an appreciative account of the labours of one to whose inspiration, as he admits, he, like many others, is so much indebted.

A folding map, which serves as a frontispiece, and has been expressly prepared for this edition of the 'Fauna,' has been made to embrace the whole county, and shows not only the Rivers, Broads, and principal pieces of water, but also the sites of Decoys, Heronries, and other places of interest to zoologists.

Mr. Southwell seems to have spared no pains to make the volume as complete as possible, and in every way worthy of the accomplished author, whose name amongst naturalists is now a "household word." He has been singularly fortunate in having

placed at his disposal a large number of Lubbock's MS. notes, together with an interleaved copy of Bewick, and an interleaved copy of his own book. This has enabled him to make many interesting additions to the original work.

On closing the volume, we have only one thing to regret, namely, that it does not contain Lubbock's Norwich Lectures, referred to by Mr. Stevenson in his memoir (p. xx). These it seems were never preserved, and unfortunately only the titles remain.

The Gamekeeper at Home: Sketches of Natural History and Rural Life. With Illustrations by CHARLES WHYMPER. Cr. 8vo. London: Smith, Elder & Co. 1880.

THIS is an illustrated edition of a book which has been already noticed in these pages (Zool. 1878, p. 358). We need not refer to the opinion which we have before expressed concerning its merits further than to observe that the favour with which it has been everywhere received fully justified our former praise of it.

It was surely a happy thought to illustrate it, for it is a book full of suggestions for an artist, and we are glad to see that in this instance the illustrations are new and original. It is too much the practice at the present day to borrow woodcuts, with little or no acknowledgment, and to illustrate a new book with engravings designed for an old one. As a result we are very often presented with impressions from worn-out blocks, not always appropriate, and not unfrequently wrongly lettered. In the present instance we have nothing of this sort. Mr. Charles Whymper's designs show considerable originality of treatment, and a complete appreciation of the author's meaning. Take, for instance, his illustration of the "Dog at Stream" (p. 75). The author of the book is contrasting instinct with mind, and describes the actions of a dog and his master on crossing a broad deep brook which has to be passed.

"The man glances at the opposite bank and compares in his mind the distance to the other side with other distances he has previously leaped. The result is not quite satisfactory; somehow a latent doubt develops itself into a question of his ability to spring over. He cranes his neck, looks at the jump sideways to get an angular measurement, retires a few paces to run, shakes his head, deliberates, instinctively glances round, as if

for assistance or advice, and presently again advances to the edge. No; it will not do. He recalls to mind the division of space into yards, feet, and inches, and endeavours to apply it without a rule to the smooth surface of the water.

* * * * *

“ Thus, step by step, the mind of the man measures the distance, and assures him that it is a little beyond what he has hitherto attempted; yet will not extra exertion clear it? for, having once approached the brink, shame and the dislike of giving up pull him forward. He walks hastily twenty yards up the brook, then as many the other way, but discovers no more favourable spot; hesitates again; next carefully examines the tripping place, lest the turf, undermined, yield to the sudden pressure, as also the landing, for fear of falling back. Finally he retires a few yards, and pauses a second and runs. Even after the start, uncertain in mind and but half resolved, it is his own motion which impels the will, and he arrives on the opposite shore with a sense of surprise.



“ Now comes the dog, and note his actions; contrast the two, and say which is instinct, which is mind. The dog races to the bank—he has been hitherto hunting in a hedge and suddenly misses his master—and, like his lord, stops short on the brink. He has had but little experience in jumping as yet; water is not his natural element, and he pauses doubtfully. He looks across earnestly, sniffs the air as if to smell the distance, then whines

in distress of mind. Presently he makes a movement to spring, checks it, and turns round as if looking for advice or encouragement. Next he runs back a short way, as if about to give it up; returns, and cranes over the brink; after which he follows the bank up and down, barking in excitement, but always coming back to the original spot. The lines of his face, the straining eye, the voice that seems struggling to articulate in the throat, the attitude of the body,—all convey the idea of intense desire which fear prevents him from translating into action. There is indecision—uncertainty—in the nervous grasp of the paws on the grass, in the quick short courings to and fro. Would infallible instinct hesitate? He has no knowledge of yards, feet, and inches—yet he is clearly trying to judge of the distance. Finally, just as his master disappears through a gateway, the agony of his “mind” rises to the highest pitch. He advances to the very brink—he half springs, stays himself, his hinder paws slip down the steep bank, he partly loses his balance, and then makes a great leap, lights with a splash in mid-stream, and swims the remainder with ease. There is, at least, a singular coincidence in the outward actions of the two.”

Mr. Whymper's portrait of the dog could scarcely be better if it were a photograph. The “indecision,” “uncertainty,” and the “nervous grasp of the paws on the grass,” so well described by the author, are very happily rendered by the artist.

His illustration of a “Hawk pursued by small birds” (p. 125), while equally forcible in character, depicts some very different features of animal life. Here we have “determination” and “fixity of purpose” in the rush of small birds, and “boldness” in the outline of the Sparrowhawk, whose upturned yellow eye, short rounded wings, and long slender legs, at once proclaim his species, so different to the dark-eyed, long-winged Falcon.

“It is difficult,” says the author, “to understand upon what principle the hawk selects his prey. He will pass by with apparent disdain birds that are within easy reach. Sometimes a whole cloud of birds will surround and chase him out of a field; and he pursues the even tenour of his way unmoved, though Sparrow and Finch almost brush against his talons, Perhaps he has the palate of an epicure, and likes to vary the dish of flesh torn alive from the breast of partridge, chicken, or mouse. He does not eat all he kills; he will sometimes carry a bird a considerable distance, and then drop the poor thing. Only recently I saw a hawk, pursued by twenty or thirty finches and other birds across a ploughed field, suddenly drop a bird from his claws as he passed over a hedge. The bird fell almost perpendicularly, with a slight fluttering of the wings, just sufficient to preserve it from turning head-over-heels, and on reaching the hedge could

not hold to the first branches, but brought up on one near the ground. It was a Sparrow, and was not apparently hurt, simply breathless from fright. All kinds of birds are sometimes seen with the tail-feathers gone: have they barely escaped in this condition from the clutches of the hawk. Black-birds, Thrushes, and Pigeons are frequently struck: the hawk seems to lay them on the back, for, if he is disturbed, that is the position his victim usually remains in. Though hawks do not devour every morsel, yet, as a rule, nothing is found but the feathers, usually scattered in a circle. Even



the bones disappear: probably ground vermin make away with the fragments. The hawk is not always successful in disabling his prey. I have seen a Partridge, dashed to the ground, get up again and escape. The bird was flying close to the ground when struck; the hawk alighted on the grass a few yards farther off in a confused way, as if overbalanced, and before he could reach the Partridge, the latter was up and found shelter in a thick hedge."

The third illustration, "Setting a Night-line" (p. 194), we have selected on account of the artistic treatment of the subject, and the skilful rendering of light and shade.



Throughout the volume Mr. Whympster seems to have aimed at a careful interpretation of his author's meaning, and as regards both text and illustrations, it forms one of the prettiest gift-books we have seen this Christmas.

The International Dictionary for Naturalists and Sportsmen. In English, French, and German. By EDWIN SIMPSON BAIKIE. Roy. 8vo, pp. 284. Trübner & Co., Ludgate Hill. 1879.

THIS capital Dictionary, which has been appearing in monthly parts, is now completed, and we doubt not will be found extremely useful by those of our countrymen whose inclinations take them periodically abroad in pursuit of sport or the study of Natural History. It contains all the terms used in Hunting, Shooting, Hawking, Fowling, and Fishing, together with a large number of technical terms employed by zoologists and botanists, and which are not to be found in the majority of dictionaries.

We have no fault to find with it except as regards size, a royal octavo being somewhat cumbersome for a portmanteau; but perhaps, if it meets with the success it deserves, the publishers may see their way to a new issue in a more handy form.

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ON THE NESTING OF THE NUTHATCH, AS OBSERVED IN NORFOLK.

BY F. NORGATE.

IN the cultivated lands and carefully tended woods of Norfolk a dead tree is seldom allowed to stand till it is rotten and soft enough for the Nuthatch, Wryneck, or Marsh Tit to bore their own nesting holes. Here and there an old dead alder may be accidentally left in a rough meadow or on a common, and occasionally a dead Scotch pine may be seen still standing on some neglected spot on the light lands. Such trees are generally riddled by a dozen or more Nuthatches' holes, most of which only penetrate about an inch deep, the wood being apparently still too hard for these birds,

The Nuthatch therefore, to a great extent, depends on the Great Spotted Woodpecker as an engineer. In taking possession of the nesting holes so industriously bored (through the living wood into the softer rotten heart-wood) by this Woodpecker, the Nuthatch has a formidable rival in the Starling, which bird (so far as my experience goes) usurps about ninety per cent. of the Green Woodpeckers' nests as soon as they are bored, and nearly as many of the Great Spotted Woodpeckers' nests also are used in their first or second year by Starlings.

The great preponderance in the number of Starlings makes the competition for nesting sites very serious for Nuthatches and Woodpeckers, especially for the latter birds, which, I believe, are not unfrequently obliged to lay their eggs on the ground. I once found a Green Woodpecker's egg on the grass near the foot of

the tree where the nest had just been taken possession of by Starlings, and I heard of another Woodpecker's egg having been found in a similar situation near its nest, which was also usurped by Starlings.

Fortunately for the Nuthatch, it can use a smaller hole than the Starling can, and it has the habit of reducing the size of the Woodpecker's nest-entrance by plastering it with very hard clay. The Nuthatch also nearly fills up the cavity of the nest (however large it may be), so that, when sitting on its eggs, the bird's beak is conveniently near the entrance. I have never seen a fight between Nuthatches or Woodpeckers and Starlings, but I am inclined to believe that the Starling perches on the top of the tree, and watches its opportunity for entering the nest when the rightful owner is absent.

The following notes made in different years may perhaps induce other observers to give evidence on the subject:—

At Weston Longville, on May 18th, I examined a Nuthatch's nest of five eggs in a hole in an old nut tree. The entrance hole was lined with very hard clay, discoloured with small bits of lichen, and indented everywhere by the bird's beak, so as to resemble the lichen-covered bark of the nut-bush. The eggs were buried in a bed of bark of *Pinus sylvestris*. This bed was about two feet thick, nearly filling the hollow trunk of the tree. The bark (of which this bed was composed) consisted of extremely thin scales, almost transparent, and evidently taken from the boughs or the upper part of the stem of the pine. The Nuthatch seemed to have some difficulty in struggling out through the clay-lined entrance.

At Sparham, on May 25th, I had a Nuthatch's nest of five eggs in a hollow post* covered with an inverted flower-pot, with a hole in the side. The birds lined the flower-pot with clay about an inch thick, and buried the eggs in scales of pine bark.

At Weston Longville, on May 27th, I saw five young Nuthatches in a hole in a large oak. For this nest no clay is recorded in my diary, nor do I remember seeing any.

At Sparham, on May 5th, the following year, Nuthatches nested again, and laid six eggs in the same inverted flower-pot which they used before. The nest was made of pine bark, and the pot lined with about an inch of clay as before. The pot

* This post was of pine with the bark on it.

being soaked with rain, the clay lining fell on the nest and broke one egg.

At Hackford, on or about the 29th of June, I saw a hollow ornamental iron gate-post, which was lined half-way up with clay by Nuthatches, and about half filled with their nest, which I was unable to examine farther.

At Fritton Decoy (Suffolk), on April 26th, I saw a Nuthatch's nest very high up in one of the large arms of a huge oak tree; the hole seemed to have been bored by *Picus major*, but was practically so inaccessible that I did not try to climb up to it.

Near Sparham, on the 8th of May, 1876, I saw three Nuthatches' nests in oak and ash trees. One, in an old nesting hole of *Picus major* in an oak, contained eleven eggs. The second nest contained young birds. Both nests had the usual bed of pine bark, and very hard clay lining reducing the size of the entrance, so that there was barely room for the Nuthatch to go in or out. In the same oak containing the nest of eleven Nuthatches' eggs was a fresh nest of *Picus major*, which (on the 19th May) contained four eggs, sat on. The third Nuthatch's nest, also in an old hole of *Picus major*, was usurped by Starlings.

At Sparham, on the following day, in a wooden box lined with clay, I found a Nuthatch's nest of pine bark, containing nine Nuthatches' eggs and two or three Redstarts' eggs at the same time. The eggs were covered with thin scales of pine-bark. I do not remember seeing either the Nuthatch or the Redstart on this nest, and it was unfortunately robbed before I visited it again.

At Foxley, May 23rd, 1876, a Nuthatch's nest, which I found in a hollow place in an oak tree, consisted of dead leaves and birch bark. There are no pine trees near this place. This nest contained three fresh eggs, which were afterwards forsaken. My diary does not record any clay for this nest, and I do not remember seeing any in it.

At "The Islands," in the parish of Dilham, May 27th, 1876, I saw a Nuthatch's nest in an ash tree in a hole where *Picus major* hatched off last year. This Nuthatch's nest contained seven white eggs, like those of *Picus minor*, except that two were very slightly spotted. The entrance was lined with clay. In the bottom of the hole, below the bed of pine bark of the Nuthatch's

nest, was a damp black mass sparkling with the remains of green and blue bottle flies, &c., and doubtless left there by the Woodpeckers. At the same place and on the same day I examined three other holes of *Picus major*, also in ash. In one which had been lately clayed up by a Nuthatch, I found a Starling's nest of five eggs. As to the following incident about the Starling, I unfortunately made no note of it at the time in my diary, but I feel sure that a Starling flew out whilst I was examining the nest, and that I took from under the Starling's nest an old dried body or skeleton of another Starling.

Near Sparham, on May 21st. 1877, I found a clutch of seven Nuthatches' eggs (sat on) in the same hole which contained a clutch of eleven eggs the previous summer. Nest as usual of pine bark and clay, On the 25th I examined another nest, also of pine bark and clay; the eggs were nearly hatched, and had the leaden hue which they (and the eggs of the Titmice also) gradually acquire during incubation. This colour is partly caused by the eggs becoming less transparent, but chiefly by some very fine dirt or colouring-matter which can be washed off; it is probably a mixture of turpentine and lichen dust from the pine bark.

In the same place the following year, on the 30th June, I saw another nest of five eggs, with pine bark and clay as usual.

In 1879, May 9th, in the same locality, I saw two Nuthatches' nests, both in ash trees, eight eggs in one, and seven eggs in the other. Although I put the birds off (and they were both "sitting"), the eggs were covered with pine bark in both nests. There was also a little hazel bark and a few dead leaves with the pine bark. The holes were as usual lined with clay. One hole, if not both, was originally made by *Picus major*. A Starling, dead and stinking, partly blocked up the entrance of one nest, and the Nuthatch was sitting with its bill almost resting on the dead Starling. The Starling was nearly (but not quite) dried up, and the Nuthatch had to pass over its body to go to or from the eggs.

On the 17th of the same month I examined another Nuthatch's nest a few hundred yards from the two last described. It contained five eggs (sat on) in an old nest of *Picus major*, which had been used also by the Great Titmouse and by Starlings.

The entrance was lined with clay. This nest was of pine bark, a few dead leaves, lumps of hard clay, and bits of dead wood.

Under all this were the putrid bodies of two dead Starlings. Had these Starlings been purposely clayed up and starved, or killed by Nuthatches?

At Taverham, on the 22nd of the same month, I saw a Nuthatch's nest in a walnut tree. Entrance hole lined with clay. Nest of pine bark, and containing two or three eggs apparently of *Parus cæruleus* buried in the bark, and mixed up with green moss, probably part of the nest of a Blue Tit, which was rather noisy in the next tree at the time. A Nuthatch was also calling in this tree or the next one (a few feet off). I found no Nuthatches' eggs here, but I believe the Nuthatch still claimed this nest, and intended to use it in spite of the Titmouse. One morning, a few years ago, I was watching from my bedroom window a Nuthatch which was peeping into a Blue Tit's nesting-box which I had fixed on the window-sill. Suddenly a Blue Tit darted at the Nuthatch, and knocked it down, falling with it to the ground. The Nuthatch seemed perfectly helpless, and glad to avail itself of the first opportunity to fly away, after receiving about a dozen sharp strokes in very rapid succession from the Blue Tit's beak. In this case the Nuthatch was "in the wrong box" (or nearly so), and was evidently taken by surprise. I think it is well able to defend its own nest against other birds generally, unless Starlings get in before the clay is hard. Even then it seems that Starlings do not always come out alive.

Woodpeckers' nests are frequently used by the Great Bat, and probably by other bats, but I never identified more than the one species named. I have found Great Bats in Woodpeckers' nests both in winter and in summer. These bats make the nests so foul that I doubt if either Woodpecker or Nuthatch would again make use of them.

Fungi also take possession of these nests sometimes, and so quickly do they grow that fresh eggs are occasionally embedded in the solid hard wood of a *Polyporus* as perfectly as a fossil shell might be in its matrix of flint or chalk. I can well imagine that some of the perennial *Polypori*, such as *Polyporus fomentarius*, might preserve eggs for many years. I once opened a Green Woodpecker's nest by boring a fresh hole into the bottom of it. The bird was in, but there were no eggs, so I plugged up the hole I had made by hammering a dead bough into it. Several days afterwards I reopened it, and found the base of the cavity

filled by a very hard fungus, which I did not take the trouble to identify. Embedded in this fungus were three Green Woodpecker's eggs, which I had great difficulty in carving out with a chisel. On the top of the fungus were four more eggs mottled and spotted regularly all over with rich brown stains, but beautifully polished, as if the colour was natural. They much resemble the eggs of the Common Sandpiper in colour and markings. On another occasion I found in an old nest of *Picus major* a clutch of Blue Tits' eggs stained almost black, but this stain was possibly caused by sap from the oak tree.

The fungus which I have found most commonly blocking up Woodpeckers' nesting holes is *Polyporus squamosus*; and I have seen a tall straight Lombardy poplar, dead and white, minus bark and boughs, and minus the top, which had been snapped off at a weak point, where was a Woodpeckers' nest, so picturesquely ornamented by the huge pilei of *Polyporus squamosus*, and so interestingly full of Woodpeckers' holes, Starlings' nests, and Great Bats, that the owner allowed it to stand until felled by the wind.

ORNITHOLOGICAL NOTES FROM DEVON AND CORNWALL.

BY JOHN GATCOMBE.

A STORM Petrel was picked up dead on the rocks at the Devil's Point, Stonehouse, on the 7th of September last. It was rather emaciated, and had sustained some injury at the carpal joint of one wing, the bone appearing diseased, the skin scurfy, and easily peeled off. On the same date a large number of Sandpipers of different kinds passed over the town at night, making a great noise. On the 15th I visited Salcombe by steamer, and observed large parties of Cormorants on every headland, besides numbers in the water; indeed, I never knew them so numerous, and my friend Mr. Clogg writes from Cornwall to the same effect, saying that he sometimes saw as many as thirty or forty standing together on the rocks at the eastern point of Looe Island. Gannets, both old and young, were also very plentiful, most of them resting on the water, which was unusually calm; but they invariably rose and flew off on the approach of the

vessel. Oystercatchers were likewise to be seen along the coast. On the 29th a Long-eared Owl was brought to one of our bird-stuffers, and I may here mention that there appears to have been quite a migration of these birds into Devon and Cornwall, as the same man received five in about a fortnight, and at the time of my writing this note had no less than nine in his shop, all recently killed. I heard also of others having been obtained. The stomachs of those I examined contained nothing but the remains of mice.

On October 6th flocks of Titlarks and Rocklarks had arrived on the coast, most of which were in nice plumage. Another Storm Petrel was obtained alive, and many Whimbrels were heard flying up the rivers. On the 15th, the wind blowing very cold from the east, small parties of Swallows were flying towards the north-east, and flocks of Skylarks coming from the eastward. Unusual numbers of Golden Plover were brought into our markets and game shops considering the time of year, and amongst them a few Redshanks. On the 15th also I observed a small flock of Purple Sandpipers on the coast, rather early for this species. Mr. Clogg mentions having seen some in Cornwall also. They are not generally met with in the neighbourhood of Plymouth until the beginning of November. On the 29th there was a Black Redstart on the rocks near the Devil's Point, a day earlier than I ever noticed one before in this locality. A large flock of Scoters was seen flying across the Sound in the morning. They generally visit us at this season, especially should the wind be easterly.

On November 1st a young Red-throated Diver was killed in the Sound, and Mr. Clogg informed me that on the 5th he watched a Great Northern Diver off Looe which had not completed its autumnal change, there being some white patches still on the scapulars, and the rings round the neck not yet obliterated; he also mentioned having seen Swallows on the 4th. Two Common Buzzards were brought to a Plymouth birdstuffer, both caught in gins; and I also examined an adult Merlin killed in the neighbourhood. An adult Cornish Chough, I am sorry to say, was likewise sent for preservation. Woodcocks were very plentiful at this date in our markets, and amongst them I noticed two Corn-crakes, Common Redshank, Bar-tailed Godwit, and a Turnstone. The following wildfowl were also to be seen hanging on the

stalls :—Scaups, Scoters, Tufted Ducks, and a large number of Mallard, Widgeon, and Teal.

Two Pomatorhine Skuas were killed outside the Breakwater on November 10th, and another found dead in a ditch far inland greatly decomposed, but I am glad to say not too bad to be preserved. On the 20th I observed a flock of eight Brent Geese flying across the Sound in the direction of the Laira Estuary; and a friend told me that he had lately seen a very large flock of wild-fowl flying up one of our rivers in the form of a V, but they were too high for him to be certain of the species. On November 20th I noticed in the market two immature Goosanders, five Shovellers, and a Sheldrake. As for Snipes, I never saw them in such numbers, and fear that most of them must have been wasted. Our harbours for the previous two months were full of young Herring Gulls; and I have often been amused with their habit of chasing the old ones and each other, like Skuas, for what they may have picked up. The Common Mew, too, I am glad to say, seems to be becoming more plentiful than it has been of late years; but I have always thought "Common" a misnomer for this species, as it certainly is not nearly so common as some other Gulls.

During the month of December the following birds were obtained on our rivers and estuaries:—several Sheldrakes, Goldeneyes, Pochards, Pintails, one Bean Goose, and two Smews in immature plumage. On examination I found the stomachs of the Sheldrakes to contain very minute shells and fine sea sand, and those of the Golden-eyes mostly shrimps.

A Grey Phalarope was killed on the St. Germain's River by a friend of mine, who reported having seen more than a hundred Oystercatchers on the river-bank, but that they were too wary to let him get within shot, and by their cries alarmed every other bird on the river. The Phalarope was not in the usual plumage of winter, but the grey of the back was intermixed with several dark feathers similar to that of a young bird in autumn. A Great Crested Grebe was brought to one of our birdstuffers, and its stomach contained a quantity of feathers plucked from its own body. I have always remarked that the appearance of Sheldrakes and Grebes in this locality betokens very severe weather; but, strange to say, during the whole continuance of the frost I did not observe a single Fieldfare or even Redwing in

the vicinity of the town, or on the immediate sea-coast, where last year there were several thousands. Missel Thrushes, too, were also very scarce, and I feared were totally exterminated by the "hedge-poppers" and extreme cold of last winter, but I am glad to say that a few are still to be seen in the neighbourhood. The wet summer last year seems to have played sad havoc with the young Kingfishers, for I did not observe one on the sea-coast during the whole of last autumn.

I have already mentioned that there was quite an immigration of Long-eared Owls, and since my note to that effect sixteen more have been brought to our birdstuffers, besides the usual number of the short-eared species. It seems strange that nothing has been said of their appearance in other places; but perhaps they might not have been distinguished by sportsmen from the usual so-called "Woodcock Owl." The stomachs of all the Long-eared Owls I examined were filled exclusively with the remains of mice, whilst those of the Short-eared species generally contained the feathers and legs of Thrushes and other small birds.

ORNITHOLOGICAL NOTES FROM NORFOLK & SUFFOLK.

BY T. E. GUNN.

ALTHOUGH the greater part of the following notes were made so long ago as 1878, they may yet be of sufficient interest to ornithologists to warrant their publication:—

PEREGRINE FALCON.—On February 9th, 1878, a male Peregrine was killed by the keeper in Kimberley Park; it had moulted its adult plumage, excepting the upper wing-coverts. It was in very poor condition, and had apparently received some previous injury. It weighed only seventeen ounces. Its stomach contained several large thread-worms, some measuring as much as eight inches and a half in length.

COMMON BUZZARD.—A male of this species was shot at Stratton-Strawless, near Norwich, on March 9th. It was in splendid plumage, the feathers being very handsomely barred. Its stomach was full of rabbit flesh and fur.

BARN OWL.—Mr. W. W. Spelman, of Yarmouth, when out shooting in that neighbourhood on September 2nd, killed a Barn

Owl with unusually dark plumage; the whole of the breast, abdomen, and under parts being of a uniform deep buff colour.*

REDWING.—On January 5th a male Redwing, obtained at Neatishead, in Norfolk, was piebald about the head and neck, and had several white feathers in the wings.

TWITE.—Four adult males with red breasts were caught by a birdcatcher in a field near Norwich on March 15th, and were purchased by me for my aviary.

HAWFINCH.—Between Nov. 28th and the end of December about a dozen Hawfinches, nearly all males, were killed near Somerleyton railway-station, in Suffolk; and on December 19th and 22nd three adult males were shot in a market garden at East Carleton, near Norwich.

GREENFINCH.—A peculiarly coloured variety was shot at Yoxford, in Suffolk, on November 27th, by Dr. Baylie of that town. On examining it I found it to be an adult male; the whole surface of its plumage of a pale buff colour, lighter in tint on the throat, abdomen, tail, and tips of wings. The outer edges of the primaries were tinged with pale sulphur, beak and legs of pale brown, and eyes as in ordinary examples.

WAXWING.—Mr. J. Womersley told me he saw a solitary Waxwing in his garden at Thorpe on Christmas Day.

HOPOE.—An adult female Hoopoe was sent me for preservation, on August 3rd, from Beccles. It was shot during the same afternoon in that neighbourhood.

STARLING.—An albino Starling, which proved to be an immature male, was shot at Attleborough on August 1st, and brought to me by a farmer of that parish. It had just moulted a few glossy feathers of its mature dress, which were also white. The tip of the lower mandible was gone,—probably shot away,—and the upper mandible had grown much beyond the usual length.

LESSER SPOTTED WOODPECKER.—A pair of these birds were seen at Rareningham, in Norfolk, on February 18th. The male was shot and sent to me. It weighed three-quarters of an ounce. The Earl of Kimberley states that these little birds have been repeatedly seen in his park during the last three or four seasons, but cannot say they have ever bred there; he has given strict orders for their preservation. Several pairs of *Picus major* breed

* See Stevenson's 'Birds of Norfolk,' vol. i., p. 53.

there every year, but the nest of *P. minor* has not yet been found in Norfolk. A male specimen of *Picus minor* was shot at Harleston in April, and was set up by an amateur, of whom I recently purchased it.

LITTLE BUSTARD.—An adult female Little Bustard was shot at Caistor, two miles north of Yarmouth, on September 12th, and came into my possession. I found its stomach filled with green food, consisting of leaves and tops of plants. The ovary contained some eggs as large as millet seed. In total length it measured 18 inches; in the wing, from the carpal joint, nearly 10 inches; and across its fully extended wings to tip of each, 36 inches; the tail, $4\frac{1}{2}$ inches; middle toe and claw, $1\frac{1}{2}$ inch; outer toe and claw, $1\frac{1}{8}$ inch; inner toe and claw, 1 inch; bill along the ridge of upper mandible, $1\frac{1}{8}$ inch; tibia, $3\frac{3}{4}$ inches; tarsus, $2\frac{5}{8}$ inches; iris, yellow; weight, 1 lb. 11 oz. It is rather remarkable that nearly all the specimens of the Little Bustard which have occurred in Norfolk of late years have proved to be females.

PEEWIT.—Amongst several Peewits that were killed on New Year's Day and sent me, my attention was especially struck with the singular appearance of one, whose legs and feet were covered with a number of warts or excrescences. I counted as many as twenty-three on one leg and foot, and seventeen on the other; they were clustered principally around each knee-joint and the base of each foot. I have previously noticed, although very rarely, an isolated wart or two on the legs or toes of certain birds; but the above is the only instance that has come under my notice (out of the many birds that have passed through my hands) in which a bird has been so much infested with this disease; I therefore think it must be of unusual occurrence.

NORFOLK PLOVER.—A female Norfolk Plover was caught in a rabbit trap on November 19th at Burgh St. Peter, near Great Yarmouth. I had one sent me from Hickling two years since caught in the same manner.

KENTISH PLOVER.—Two or three specimens of the Kentish Plover, a few Red-breasted Godwits (Bar-tailed), Turnstones, and Grey Plovers were seen on the Breydon Muds, Yarmouth, on April 19th, and on the 23rd of same month a female of the former species was shot. An adult female of the Kentish (locally called "Alexandra") Plover was shot in the same locality on

October 16th, and sent me; another, also a female bird, was killed about the same time, and is now in Mr. Spelman's collection at Yarmouth. During the month of August a male Little Stint in adult plumage, a red Knot, and two Bar-tailed Godwits—one red, the other partly so—were sent me up from Aldeburgh, in Suffolk; a Sanderling in full winter plumage and several Knots were sent me from same locality on January 15th.

TURNSTONE.—On May 15th, being on Breydon in a punt, I saw two old Turnstones on the mud-flats, and was much interested in watching their actions by the aid of my field-glass. They were very tame, and allowed me to approach within thirty yards of them.

TEMMINCK'S STINT.—On August 24th Mr. R. F. Harmer, of Yarmouth, shot the most immature specimen of Temminck's Stint I ever saw killed in Norfolk. It was a female by dissection, and in total length measured $6\frac{1}{4}$ inches in length; across fully extended wings, 12 inches; carpal joint to tip of longest primary, $3\frac{1}{2}$ inches; tarsus, $\frac{1}{6}$ inch; bill, $\frac{1}{8}$ inch; tail, 2 inches; middle toe and claw, $\frac{1}{6}$ inch.

PURPLE HERON.—The Purple Heron mentioned at page 159 of 'The Zoologist' for 1879 as having been killed during the middle of December, 1878, was shot on the 17th of October previous, and sent up to me the following day from Yarmouth.

NIGHT HERON.—An adult male was obtained on May 10th, 1879, in the parish of Mendham, near Harleston. A young man named Chesney, a workman at the mill, saw a curious bird towards evening fly across an adjoining field, and alight on the branches of a tree; he immediately procured a gun, and walking up to the tree shot it easily; he called it a young Hearnshaw, and afterwards gave it to Mr. Read, farmer of that parish, from whom I subsequently obtained it. It was in perfect plumage and condition, and had two long white feathers in its crest.

BITTERN.—One was shot near Yarmouth on February 13th.

POLISH SWAN.—On February 16th a fine adult pair were shot on Wroxham Broad; both had perfect wings, the male weighing 22 lbs., and the female 19 lbs., and measuring five feet in length, the male being two inches longer.

EGYPTIAN GOOSE.—Mr. R. H. Gillett killed one of these birds on December 19.

GADWALL.—A male Gadwall, rather a scarce duck in Norfolk, was shot on December 26th at Lynn, and on the same day a male Shoveller was killed at Yarmouth.

GULL-BILLED TERN.—On May 8th an adult specimen was killed at Yarmouth by a Breydon gunner, and sold by him as a Sandwich Tern; it changed hands several times, but was unfortunately kept too long, the weather at the time being warm, and favouring decomposition, so that when I saw it, several days after it was shot, it literally dropped to pieces, and was quite unfit for preservation. I had, however, fortunately received another specimen which was killed on the same day at Yarmouth; this was doubtless the companion to the first-named, for two were seen together by the gunner referred to. On dissection, this latter bird proved to be a female, the ovary containing a large cluster of eggs, several as large as hemp-seed. The bill, legs, and feet were black, eyes dark brown, and the following are the dimensions:—Total length (beak and tail included), $15\frac{1}{2}$ inches; fully extended wing to extreme tips, 36 inches; wing carpus to tip, 13 inches; bill along curve of upper mandible, $1\frac{1}{2}$ inch; bill depth at base, $\frac{1}{2}$ inch; tail (tip to root included), $5\frac{1}{4}$ inches; weight, 7 ozs.

BLACK TERN.—An adult female Black Tern just assuming its winter plumage, and showing the forehead and throat white, was killed at Yarmouth on August 6th. In this change this species is of rather unusual occurrence here. I shot a similar specimen during the corresponding period of 1873 on Hickling Broad, this being also a female.

RED-THROATED DIVERS.—I saw three of these birds in our market on November 7th, and was told they had been sent up from the Broad districts. I had one sent me that was killed at Rockland, about seven miles from Norwich, and the Rev. C. J. Lucas told me one was killed on Filby Broad on the 13th.

BLACK-THROATED DIVER.—A male in immature plumage, but showing a few square white spots on its back and shoulders, was shot on Oulton Broad, near Mutford, on November 15th.

LITTLE AUK.—Two Little Auks, male specimens, were picked up near Norwich, and sent to me on November 9th. One was found at Plumstead Parva not quite dead; these birds had been driven inland by the severe storm that prevailed the previous night.

In concluding these notes, I may add that nearly all the birds mentioned passed through my hands, besides several others which have been already recorded in 'The Zoologist.'

OCCASIONAL NOTES.

ANIMAL SOUNDS.—In the 'Complaynt of Scotland,' 1549, a reprint of which, edited by Mr. A. J. H. Murray, appeared in 1872, the following quaint passage occurs:—"The *Nott* (neat cattle) made noise with many a loud *lou*. Both horse and mares did fast *nee*, and the foles *nechyr*. The bulls began to *bullir* when the sheep began to *blait*, because the calves began to *mo*, when the dogs *berkit*. Then the swine began to *quhryne*, when they heard the ass *rair*, which made the hens *kekkyll* when the cocks *creu*. The chickens began to *peu* when the glede *quhissillit*. The fox followed the fed geese, and made them cry *claik*; the goslings cried *quhilk*, *quhilk*, and the ducks cried *quaik*. The *ropeen* of the ravens made the cranes *crope*; the hooded crows cried *varrok*, *varrok*, when the swans *murnit*, because the grey goul man (gull men) prognosticated a storm. The turtle began to *greit* when the cushat *zoulit*. The titlene (hedgesparrow) followed the goilk (cuckoo), and made her sing *guk*, *guk*. The dove *crouitit* her sad song that sounded like sorrow. Robin and the little wren were homely in winter. The *iangolyne* of the swallow made the jay *iangil*. Then the mavis made mirth for to mock the merle. The laverock made melody up high in the skies. The nightingale all the night sang sweet notes. The tueichitis (lapwings) cried *theuis nek* when the piettis (magpies) *clattirt*. The *garruling* of the starling made the sparrows *cheip*. The lyntquhit (linnet) sang counterpoint when the ouzel *zelpit*. The green serene (green linnet) sang sweet when the gold spynk (goldfinch) chanted. The redshank cried *my fut*, *my fut*, and the oxeye (tontit) cried *tueit*. The herons gave a wild *screech* as the kyl had been on fire, which made the quhapis (curlews) for fleetness fly far from home."

HABITS OF THE STOAT.—At p. 122 of 'The Zoologist,' Mr. Gatecombe remarks upon the so called "ermine" dress of the Stoat, "Specimens are met with in their white, or partly white, winter dress in comparatively mild seasons." Such is my own experience, and having from time to time seen many specimens, I am inclined to think that the severity of the weather is not the whole cause of the change of colour; and I am further confirmed in my supposition from the fact of having seen one in its partly white dress as early as October of the present year. Whether it is usual for them to

change colour previous to the winter months I am not in a position to say. When are the creatures supposed to assume their winter garb, and is it well known in what manner the change of colour is affected? If the one I saw had been endowed with reasoning faculties, and the power of changing its own coat, I might have said that its experience of the past summerless season had induced it to anticipate a correspondingly cold winter, or that the summer was not sufficiently warm to warrant a change from last winter's outfit. Mr. Bond says (Zool. 1879, p. 455) he has never seen a true albino Stoat. Neither have I; but a few winters ago I saw one wholly white, with the exception of the smallest patch of brown—no larger than a sixpence—upon the crown of its head, and the characteristic black tip to its tail, which latter was very conspicuous from the unusual whiteness of the rest of the body; for it doubtless has been observed that the white colour in many specimens is tinged with a yellow or pale brown shade, but possibly the more entire the change the whiter the individual becomes. I ought here to remark that the above specimen had not pink eyes, and consequently was not a true albino. Possibly, however, an animal that periodically changes its colour cannot be called an albino at all, but to come under that designation it must be altogether and always white. While on the subject of Stoats, I may be allowed space for the following notes:—Some time ago when out entomologizing along the hedge of a ploughed field, my attention was attracted to a certain spot at no great distance, from whence proceeded a peculiar cry; standing quite still, to ascertain if possible the cause and purpose of such a performance, I saw a large rat emerge from the hedge and run out some distance upon the ploughed land, but only to return again and enter the hedge at a different point from where it had first appeared. I had not time to ask myself what could be the cause of such apparently strange behaviour, when I saw a Stoat make its exit from the hedge at exactly the same place as the rat had done, and, with back arched and nose to the ground, it seemed to follow every footstep of the poor doomed rat, like a bloodhound on the trail, back into the hedge again. The Stoat had scarcely entered the hedge when the cry of the rat became more piteous and piercing, and I hastened cautiously to the spot to see if possible the end of the fray; the density of the hedge, however, prevented my doing so, although I could hear a rustling and the gradually decreasing cry of the rat. It was evident the Stoat had no idea of forsaking its victim until it had accomplished its work, for having cleared aside the brambles, &c., sufficiently, I found the rat almost dead, with the least indication of blood behind one of its ears. Is it customary for the Stoat thus to hunt by scent, as well as by sight? In the case just cited it seemed to make far more use of its nose than of its eyes, and the rat certainly appeared unable to exercise the all-powerful right of self-preservation, and to be held in thrall by the strange fascination which these

creatures are said to have over their victims. During the past summer, I was one afternoon standing at an open window overlooking a large lawn, when I saw a rabbit acting in a most peculiar manner, running apparently in circles, and, as far as the intervening bushes would allow me to observe, each circuit decreasing the diameter of its rounds, until at last I lost sight of it altogether behind the bushes. I thought at first it was playing with one of its own kind, as rabbits often do in the early evening; but as I saw no other anywhere near the spot, I for a moment questioned myself what could be the cause, but was not long in doubt, for it had disappeared behind the bushes but a short time, when I heard the cry which only too plainly told that a Stoat was doing its deadly work. I was too far off to hear if the rabbit made any noise during its gyrations; if it did so, the cry must have been much fainter than when the Stoat fastened on to its neck. It was some little time after the above performance when I went to look at the spot where it had taken place, and thinking the Stoat might still be in the vicinity I crept quietly thither. The Stoat, however, saw me long before I reached the place, and proceeded to make off across the lawn, and I could not but admire the actions of the artful little beast; if I stood still it would rise up on its hind legs, and move its head from side to side as quickly as possible, at the same time uttering a faint kind of squeal, as if annoyed at my presence, but if I advanced a step, either towards itself or the rabbit,—which was lying dead at no great distance,—it would lie flat upon its belly, vainly endeavouring to hide amongst the closely-mown grass. Is not the power of fascination said to be in the eye of the creature exercising it? In the case of the rabbit it might have been so, but with the rat it must have been different, and yet neither seemed to have the power of escape from their bloodthirsty enemy.—G. B. CORBIN (Ringwood, Hants).

[Replying to our correspondent's queries, we may remark that we once came upon a Stoat in Selborne Hanger, which had assumed a good deal of its white winter coat in the month of October. We do not regard this change as dependent upon severity of weather, but as analogous to the change of plumage in birds which takes place at particular seasons as a rule, irrespective of temperature, although we do not doubt that sudden changes of temperature may operate to hasten or retard the change. We do not remember to have seen a Stoat in midwinter retaining its summer coat, or a pied or white Stoat in summer time. That this animal hunts by scent we have long been convinced, having repeatedly proved it to our satisfaction by personal observation.—ED.]

CURIOUS ACCIDENT TO A HARE.—A curious fate befel a Hare during the late severe weather in one of the dew-ponds of the elevated chalk range of this neighbourhood, which may be worth noticing. The unfortunate animal, either to elude her pursuers or during her nightly ramble, trusted herself

on the treacherous pathway of newly-formed ice, and, falling in, lost her life; but not by drowning, for the upper part of the head and nose were protruded through and above the ice. It is probable, as is usual with snared Hares, after finding her struggles unavailing, she remained tranquil, with the only effort of keeping her head up. The icy collar in so exposed a spot (upwards of 800 feet above the sea-level) would form itself almost momentarily when undisturbed, and prevent the lifeless body from sinking. The Hare was seen for the first time on Monday, December 1st, when the minimum temperature on the previous night, in this more sheltered district, at an altitude of only 340 ft., was as low as 26°. On the following Friday a labourer exhumed her, and brought her to his *cuisine*, and pronounced her to be the very best Hare he had ever tasted. There is an incident narrated by the Abbé Huc, in 'Les Souvenirs d'un Voyage dans la Tartarie et le Thibet,'—a book full of amusing stories, more romantic perhaps than veracious,—which bears somewhat upon the above narrative. He describes himself as crossing a Thibetian frozen river, on his journey to Lasso, capable of bearing the weight of his cavalcade, and observing a number of small black objects protruding through the ice, he was told by the attendants they were the noses of a herd of wild cattle (*Yak*) which had been entrapped at the time of passing from one bank to the other. The Abbé makes no mention of the horns, which must have interfered more with his progress, had they been there, than the noses.—J. C. MANSEL-PLEYDELL (Whatcombe).

HARVEST MOUSE IN SUFFOLK.—On November 31st I obtained a nest of the Harvest Mouse from Leiston. It was built about three feet from the ground, among some straggling blackthorn bushes growing by the side of a ditch. Some years ago I found a nest of this little animal built in a plant of the common broom. These tiny creatures are fond of frequenting the tall rank herbage growing by the sides of ditches.—G. T. ROPE (Blaxhall, Suffolk).

ON A PARROT PERFORMING A SURGICAL OPERATION ON LIVING SHEEP.—On the 4th of November last the distinguished surgeon, Mr. John Wood, F.R.S., exhibited before the Pathological Society of London the colon of a sheep, in which the operation known as Colotomy had been performed by a Parrot. The specimen, together with a skin of the bird, had been sent to him for this purpose by Mr. De La Tour, of Otago, New Zealand. The Parrot was the species known as the "Kea" by the Maories, the "Mountain Parrot" of the colonists, *Nestor notabilis* of Gould (Proc. Zool. Soc. 1856, p. 94). Only five species of the genus *Nestor* are known, one of which (*Nestor productus*) has lately become extinct; they only occur in New Zealand and Norfolk Island. They were formerly classed among the *Trichoglossinæ*,

or brush-tongued, honey-sucking Parrots, even by such recent authorities as Dr. Finsch (1867) and Prof. Sundevall (1872); but the late Prof. Garrod has shown (Proc. Zool. Soc. 1872, p. 787 f, and 1874, p. 586 f) that they are much more nearly allied to the true *Psittaci*, notwithstanding the delicate fringe of hairs that forms a kind of flat brush at the tip of the tongue, and it is now generally agreed that a separate subfamily *Nestorinæ* must be formed for their reception. Twenty years ago the "Kea" was very little known, but it is now found to be abundant in the higher regions of many parts of the South Island, whence it only descends to the more inhabited plains during severe winters. Its ordinary food consists of berries and insects; but since its alpine haunts have been reached by the tide of civilisation it has acquired a taste for raw flesh, to obtain which it even attacks living animals. Dr. Buller, in his 'Birds of New Zealand' (1872, p. 94 f), writes of this bird;—"Those that frequent the sheep stations appear to live almost exclusively on flesh. They claim the sheeps' heads that are thrown out from the slaughter-shed, and pick them perfectly clean, leaving nothing but the bones." And an eye-witness thus described the operation to Dr. Hector:—"Perching itself on the sheep's head or other offal, the bird proceeds to tear off the skin and flesh, devouring it piecemeal, after the manner of a Hawk; or at other times holding the object down with one foot, and with the other grasping the portion it was eating, after the ordinary fashion of Parrots." In Dr. Buller's work Mr. Potts has given a long and picturesque account of the bird's natural and acquired habits. Mr. De la Tour informed Mr. Wood that when the sheep, are assembled wounds resulting from the Kea's "vivisection" are often found on them, and not unfrequently the victims present an artificial anus—a fistulous opening into the intestine—in the right loin. The specimen exhibited was from a sheep that had been so attacked. It consisted of the lumbar vertebræ and the colon, showing the artificial anus between the iliac crest and the last rib on the right side—just in the place, that is, where modern surgeons perform the operation known to them as Amussat's; below the wound the intestine was contracted, while it was enlarged and hypertrophied above. The sheep was much wasted. The *modus operandi* was described as follows:—The birds, which are very bold and nearly as large as Rooks, single out the strongest sheep in the flock; one bird, settling on the sacrum, tears off the wool with its beak, and eats into the flesh till the bird falls from exhaustion and loss of blood. Sometimes the wound penetrates to the colon, when, if the animal recovers, this artificial anus is formed; it may be on the left, but is more frequently on the right side. It has been suggested that the bird aims at the colon in search of its vegetable contents; but the Kea's carnivorous appetite has been too frequently noticed to necessitate any such hypothesis. This strange phase of development through which the Kea has gone since the European colonization of New Zealand, and the consequent introduction of sheep to islands in which indigenous

mammals are almost unknown, by which it has come to prefer an animal to a vegetable diet, was first described in 1871 by Mr. T. H. Potts ('Nature,' vol. iv., p. 489); but it was reserved for Mr. De la Tour to discover the interesting result which Mr. Wood has just introduced to English naturalists.—HENRY T. WHARTON (39, St. George's Road, N.W.)

TWO SPECIES OF BIRDS LAYING IN THE SAME NEST.—There is ample evidence that the Partridge and the Pheasant will occasionally lay their eggs in the nest of another of their respective species (Yarrell's 'British Birds,' 2nd ed., pp. 312, 372): that the barn-door fowl is much addicted to the same cuckoo-like propensity (Waterton's 'Essays,' vol. i., p. 264): and that ducks (and especially the Eider duck) is apt to perpetrate the same vagaries (Rennie's 'Architecture of Birds,' p. 74): while the occasional habit of clubbing together for a joint nest on the part of other birds of the same species, such as Jackdaws and Long-tailed Tits, has been positively asserted by some (Zool., 1st ser., pp. 1775, 2567). Moreover, that the Partridge will sometimes lay her eggs in a Pheasant's nest, and the Guinea Hen in a Partridge's nest, has been authoritatively declared (Zool., 1st ser., pp. 186, 454), and I suppose we may assume with tolerable certainty that, under certain exceptional circumstances which we cannot fathom, such an unusual proceeding may be looked for among birds in general. Within little more than a twelvemonth two of these exceptional cases have been brought to my notice. The first occurred in June, 1878, when I was asked by the finder to examine an egg which he had taken from a Partridge's nest, but could not recognise, the said nest containing eight Partridge's eggs and five of these interlopers. There was not the smallest doubt in my mind, as soon as I saw it, that the strange egg was that of the Red-legged Partridge, and I should not have been at all surprised at the occurrence on the part of a gallinaceous bird, which seems in some degree addicted to such ways, but from the extreme rarity with which *Perdix rufa* occurs in this neighbourhood; for it is only as a rare straggler that this species is seen once in several years in this district. Now the fact that the eggs of *P. rufa* were found in the nest of *P. cinerea* is a plain proof that a hen bird of the former species had strayed into that locality, and yet I could not ascertain that a single specimen of that species had been seen before or after the eggs were found, though that some young Red-legged Partridges were hatched out I firmly believe, both because the egg brought to me contained an embryo chick within a very few days of hatching, and because my informant subsequently saw the fragments of shells near the nest, such as are usually seen after hatching. This is only another proof of that which I recognise more fully every day—what a very small portion in reality do we see and know of the birds and their habits with which we think ourselves so familiar! Not so remarkable, perhaps, in the eyes of some ornithologists, is my second

instance, which occurred last April, when a gentleman in this parish brought me an egg of the Kestrel and another of the Sparrowhawk, both taken from the same nest, to the considerable amazement of the finder. I say this may not so much astonish the ornithologist, who recollects that both species are apt to make use of the deserted nest of the Crow, and yet it is not, I think, by any means a common occurrence, and so I have deemed it worthy of record in the pages of 'The Zoologist.' At first I entertained the opinion that possibly the Sparrowhawk, whose eggs vary much in colour, might have laid one of abnormal colouring, even running into the exact hue of the Kestrel, just as the Blackbird will occasionally lay eggs closely resembling those of the Song Thrush, thereby proving the affinity of the several members of the genus *Turdus*. Indeed, one such egg of the Blackbird, taken by myself in this place, I forwarded many years since to Mr. Hewitson, who thought it worthy of a place in the last edition of his work; but then all the eggs in that nest were alike in colouring and marking. On further consideration, however, I do not think the Hawk's eggs in question can be referred to one and the same parent; there is no blending of one with the other, no partaking of the markings of both; but the colouring of the one egg proves it to be so unmistakably a Kestrel's, and that of the other no less pronounced a Sparrowhawk's, that I think two birds must each have laid an egg in the same nest. Possibly this may not be so rare an occurrence as I imagine; if so, I shall be glad to hear of further instances. —ALFRED CHARLES SMITH (Yatesbury Rectory, Calne).

A POMPEIAN BIRD SHOP.—A correspondent of 'The Times,' writing some time since from Pompeii, gives an interesting account of the excavations which are being carried on there, and amongst other curious discoveries, thus notices the ruins of a bird-dealer's shop, which had been brought to light:—"No sooner was the excavation of this chamber commenced than a number of bronze and terra-cotta vessels, bronze fibulæ, bracelets and rings, iron keys, kitchen utensils, and other articles of household use were found almost in a heap together near the door, and among them a considerable number of small earthenware pots, which I somewhat incredulously heard described as drinking cups for birds; but there soon followed abundant proof that this had been the shop of a seed merchant and seller of singing birds, and very little imagination was required to see the place as it was the day before the fatal eruption of 79. At first the room seemed to have been a mere receptacle for a miscellaneous collection of bronze and earthenware objects. There was no special character about it. The walls bore no traces of painting, but, as the clearing was continued, to the left of the door on entering, a heap of millet-seed was found, so carbonised that on taking up a handful it flowed between one's fingers, for every grain was separate and distinct. It was taken away in baskets full.

Close to this a quantity of hemp-seed, and of what appeared to be small beans in the same well-preserved condition, were found, and among them considerable fragments of the sacks in which they had been kept, the fibre and texture clearly distinguishable. Behind these heaps and against the wall more seed was dug out, mixed with heaps of carbonised wood, iron hinges and nails, and some iron hoops, evidently the remains of small barrels and bins which had been ranged on this side, while along the opposite wall a double row of terra-cotta ollæ for holding grain was gradually revealed. Suddenly there arose a cry, '*un ossa*,' '*un scheletro*,' and the excitement became intense; but the bones were small—at first they seemed mere fragments, and then the Director exclaimed, amid quickly following laughter, 'A chicken!' Here the filling in had become somewhat solidified, and as it broke apart a complete skeleton was revealed. It was that of a little singing bird, entirely embedded in the mass, and near it were fragments of other tiny bones. There could no longer be any doubt that the use of the little terra-cotta pots had been correctly described. It became clear why so many of them were found there, and that the number of plain bronze rings of about an inch and a half in diameter, and pieces of fine chainwork discovered, had been used for hanging birdcages. But what connexion had all those bronze vessels and ornaments near the door with a seed and bird-seller's shop? This also soon became evident. As the excavators continued farther into the room, great masses of carbonised beams of wood were found, each somewhat inclined downwards, and among them a quantity of fragments of intonaco and stucco wall-facing, coloured porphyry with a border of green and white. These were at once seen to be the remains of the floor of the room above with some of the plastering of its walls, and from the direction in which the beams were lying it was evident the floor had given way in the middle and towards the door of the shop below, precipitating the greater part of the contents of the upper room in that direction, the remainder falling towards the middle, and it was here the elegant long-stemmed candelabrum was found among the masses and fragments of carbonised wood. Did the worthy birdseller live above his shop? Did this candelabrum and the various bronze vases and other utensils form part of his domestic furniture? Who can tell?"

[In all probability the ground-floor only was occupied by the bird-dealer, while the floor above was perhaps tenanted by a dealer in candelabra and vases. One can hardly suppose that a bird-dealer could afford to own such works of art as were here discovered.—J. E. HARTING.]

SISKINS BREEDING IN CONFINEMENT.—It is now some ten years since I first tried to get Siskins to breed in confinement, and although, after many failures, I obtained nests of eggs, and occasionally young ones, it was only last year (1878) that I succeeded for the first time in rearing one out

of a nest of four. This year, acting on the experience I had gained, I placed a Chaffinch's nest—for which kind they had a decided preference—in an open wire nest-basket, such as are made for Canaries to build in, and which hook on to the wires of the cage. This is a matter of some importance, as the birds seem to take great delight in trimming and beautifying the outside of their nest—a fancy they could not indulge if they had to build in a box or close basket. Having relined this nest with portions of others, and made it fit, the hen commenced laying a batch of five eggs on the 15th May, one being laid every day, but she began to sit as soon as the third egg was laid. I may here observe that as soon as the hen has seriously determined to build she continually utters a low plaintive note, heard at no other time of year, and then, and not till then, does she set to work in earnest. The cock takes no part in the construction of the nest, but is very attentive to his mate whilst she is sitting on her eggs, frequently bringing her food, which she receives, fluttering her wings and uttering the breeding notes. When the eggs were about to hatch I kept in the cage a plentiful supply of watercress and groundsel in jars of water, hard-boiled egg, sprays of millet (which had been frequently soaked in water for twenty-four hours), and gentles; these latter I obtained from Mr. Williams, of 10, Great Queen Street, Lincoln's-Inn Fields, where they can be purchased all the year round as bait for the use of anglers. On the morning of the 29th May three eggs were hatched, another on the following morning, and the fifth later on the same day. During the first eight or ten days the young ones were fed entirely on gentles, those in the pupa or chrysalis state being preferred; the other food was then gradually mixed with the gentles, which were used less and less, and were entirely discarded by the time the young ones were three weeks old. The food is first swallowed by the parent, and then ejected into the mouth of the young ones. I observed that a few grains of sand were generally taken with the food that was about to be given to the young ones. The young are born without any hair or down on them. They grow rapidly; their eyes are open on the sixth day; the stumps of the feathers begin to appear on the seventh or eighth, and they leave the nest fully feathered when they are fifteen days old, and a few days later are able to feed themselves. Care must be taken not to let them have any hard seed till they are about six weeks old; the soaked seed may then be gradually withdrawn and replaced with ordinary seed. When my young birds were seven days old, the cock—who till then had never fed them—commenced taking charge of them, and the hen began to evince a desire to nest again, pulling pieces out of the nest in which her young were, wherewith to build a new one. I therefore supplied her with another, in which, after due alterations, she laid five eggs. These, however, did not hatch, the first being laid on the 10th June and the last on the 15th—that is, in six days. The three young ones which were hatched first were strong,

healthy birds, but the other two were weakly; one died in a few days, and the other, though sickly, lived to the age of three weeks. It was interesting to see how carefully the sickly one was tended by its mother, who would wait till the clamour of the others had subsided, and then, gently touching it with her beak as a signal for it to open its mouth, would feed it before its more vigorous brethren could thrust their ever hungry mouths in the way. Even when the others had been handed over to the charge of the cock she continued to feed this little one, frequently leaving her eggs for the purpose. In general appearance and call-note the young bear a strong resemblance to young Chaffinches. The colour of the feet and legs of the wild Siskin, both young and old, is dark brown; but, as is the case with some other Finches,—Goldfinches and Bramblings, for instance,—they become quite pale after moulting in confinement. Hence the term “white-legged” birds amongst dealers, signifying birds that have been caged some time. The feet and legs of my young birds were, however, always pale. The beak of the wild Siskin, when young, is always dark, nearly black, though it becomes lighter in the adult, but in my young ones the beaks were always pale. Three birds were reared, but one fell a prey to a cat; the remaining two, both of which are cocks, have nearly assumed the adult plumage. Moulting is a tedious process with caged Siskins, and they suffer a certain amount of pain. Not so, however, with the young ones; they moult rapidly and well, and suffer so little inconvenience that they are in song the whole time. I have never bred Bramblings, but I have little doubt that they would require similar treatment.—J. YOUNG (5, Denbigh Road, Notting Hill).

NESTING OF THE WOODCOCK.—I read with much pleasure the interesting essay on the habits of the Woodcock (Zool. 1879, p. 433); but, nevertheless, felt somewhat surprised to find that the fact of this species breeding in England is not more generally known than it would appear to be from Mr. Harting's remarks. While we were residing in Oxfordshire, now twenty-five years ago, Woodcocks's nests were frequently found in that part of the kingdom. When I say frequently, I do not mean that Woodcocks' nests were common, but that few years passed by in which a Woodcock's nest was not discovered in one or another of the great woods of Oxfordshire and the adjacent counties. In the Midland district such occurrences are still more frequent; and in Sherwood Forest, where, in the company of my brother, I have spent many very interesting and happy days, the nests of Woodcocks may almost be said to abound. There this species annually breeds in great numbers, and during the spring and summer months, as soon as evening approaches—even before the sun has set—Woodcocks may constantly be seen flying in pairs just above the tops of the multitudinous oak trees. Indeed it is not unusual to see two or three pairs at the same time flying round the trees, and occasionally indulging in graceful evolutions

in the full enjoyment of their evening flight. While thus engaged they sometimes utter a very faint cry, slightly resembling the cry of the Snipe, but more musical. Our visits to the forest have sometimes taken place during the summer months, after the young birds had left the nest; but on rare occasions, in the month of April—the earliest period at which we have ever been there—we have disturbed Woodcocks by accidentally approaching their nest, and seen them run in a shuffling manner for a few yards, and then take a short flight and settle again. At such times we invariably withdrew to a greater distance. It may perhaps be asked, why we did not pursue the investigation? but for many reasons I think the course we adopted was the wisest, and certainly the most considerate. If we had examined the eggs or young birds ever so accurately we should have gained no fresh information on a subject already so well known, but should only have wasted time of much importance to our entomological pursuits, and in addition to this should have broken our promise to the keepers, that we would in every way avoid disturbing the game. Indeed this is a point that I would most strongly urge on all who visit Sherwood. Since the noble proprietors of the last remnants of the forest have so kindly instructed their gamekeepers not to interfere with anyone who is honestly in pursuit of Natural History, the very least that naturalists can do in return for such liberality is to abstain from penetrating the thickets and scaring their inhabitants, most especially during the breeding season. The brood of Woodcocks in Sherwood Forest is of no small consequence to the game-list. I have myself been told by one of the keepers that he has known as many as 120 Woodcocks bagged in one day by only six guns, and that at all shooting parties these birds form an important item in the day's sport. Let all naturalists bear this in mind, and, without some better reason than finding a Woodcock's nest, confine their rambles to the more open glades of the forest. Our visits to Sherwood very seldom took place before the latter part of May, at which time young Woodcocks would be able to shift for themselves. Nevertheless I remember once having observed a Woodcock carrying, as we thought, something in its feet; but the daylight was failing at the time, and we fancied that we might have been deceived. In Sherwood Forest it would be unnecessary for the parent birds to transport their young to any distance in search of food. The whole surface of the ground in the thickets is covered with decaying leaves, in the hollow places often to a great depth, and among these leaves worms and other small animals abound in countless numbers. These are the proper food of the Woodcock, and the idea that Woodcocks and Snipes live by suction is, as Mr. Harting observes, a simple absurdity. The mistake doubtless arose from the fact that, in search of food, these birds will often plunge their long bills up to their eyes into soft ground. I have often seen spots positively honeycombed by their borings; but the true object of this is to find worms,

and not to suck out the moisture. Their bills are specially adapted to this purpose; besides the fact that the upper mandible is produced into a solid point which overlaps the end of the lower mandible to facilitate the operation of boring, these birds possess the power of opening at will the extremity of the bill while the rest of that organ remains tightly closed. The extremity of the bill is also for some length tender and sensitive on the outer surface, and can therefore both feel the worms and capture them with every function of a finger and thumb. Anyone may convince himself of the truth of this by holding the bill of a Snipe just killed tightly closed with one hand, while with the other hand he presses the muscles at the base of the hinder part of the skull; he will then see the extremity of the bill open sufficiently to capture a worm or any such animal. In a very few hours after death the muscles become rigid and the point of the bill hard and shrivelled, and this power of action is lost. I cannot think that Woodcocks have more frequently remained to breed in this country of late years than they used to do in former times. Indeed my own experience would lead me to suppose that in point of numbers the species has become much scarcer; and I quite agree with the opinion of Sir W. Jardine, quoted by Mr. Harting, that the fact of a greater number of their nests having been discovered is owing to the increase of ornithologists rather than Woodcocks.—A. MATTHEWS (Gumley, Leicestershire).

WOODCOCK CARRYING ITS YOUNG.—I have read your article on the Woodcock (Zool. 1879, p. 433). Although I have seen the bird carrying its young, I never observed any daylight between the legs. As the bird flies away, the hind quarters droop, and it looks more like a huge wasp or hornet than anything else. I am no draughtsman, but I send you a rough outline of what I have seen. The tail and hind portion drooped even more than in my sketch. I could never make out the feet and legs, and realize the exact mode of grip. The small Woodcock in the distance, in your plate, is like the thing, if the tail were depressed a bit.—J. DUNBAR BRANDER (Pitgaveny, Elgin, N.B.).

MIGRATION OF WOODCOCKS AND SNIPE.—Towards the end of November I went to shoot in a large cover, celebrated for Woodcocks, near here, and where, the previous week, eight had been seen. The day I speak of was cold, with snow—no frost—and we did not see one. My friend and I remarked that this was ominous of cold weather. The next day the frost set in, and I have no doubt the Woodcocks' instinct had advised them to quit their quarters. In 1878 I remember seeing a great many Snipe flying round and round in circles over a meadow, no doubt preparing to migrate; for, a few days after, severe weather set in. We have had no Fieldfares, and but few Redwings, either this winter or last. Did their instinct lead them further west or south at the autumn migration?—W. J. TOMLINSON (The Woodlands, Burton-on-Trent).

WHITE-FRONTED GOOSE IN NORTHAMPTONSHIRE.—I received on the 10th January a very fine adult specimen of the White-fronted Goose, *Anser albifrons*, from my friend Mr. G. E. Hunt, who shot it on the 6th of the same month, in one of my meadows on the River Nen near Aldwinkle, Northamptonshire. I see in a late number of 'The Field' that two others of the above species are recorded by Mr. Tomalin as having been shot in our county—one near Northampton, and the other near Wellingborough, in the first week of January. Five and twenty years ago I should have hardly considered such occurrences worthy of record in 'The Zoologist,' as the White-fronted, though less common than the Bean and Pink-footed Goose, was by no means, at that period, an exceedingly rare bird; but now, instead of the hundreds of various species of wild geese which used to visit the valley of the Nen in the winter months, many seasons pass without my hearing of more than perhaps half a dozen passing over our district.—LILFORD (1, Grosvenor Square, W.).

SCARCITY OF GOLDEN PLOVER IN SOUTH OF SCOTLAND.—I have just read with interest the remarks of Mr. Cordeaux (pp. 14, 15) upon the wonderfully large flock of Golden Plover which he saw in Lincolnshire at the commencement of the severe frost at the beginning of last December; and I see that he further mentions having scarcely seen a single bird of this species previously during the autumn. Judging from my own observations in the South of Scotland this autumn and winter, I can state that the movements of Golden and also of Green Plover have been very remarkable and have puzzled the sportsmen of Dumfriesshire, Ayr, and Galloway very considerably. In most years there are plenty of both these Plovers in certain likely haunts in all these counties; but on most of the properties on which I shot last autumn, there were scarcely any of these birds in places and at times where, during ordinary years, there were quantities. This was equally the case upon the sea-shores of the south-west of Scotland, as in the marshy grounds bordering the rivers, and upon the lower-lying moors, where often we see large "stands" of Plover in September and October. Shooting in Dumfriesshire from November 20th to December 15th last, on a large estate of some twenty miles in length and as many in breadth, where during hard frost the Golden Plovers in other years were almost countless, I only met with one flock during the above time, and only saw these on one day, and I may add that the frost was not very much harder than in previous years. Many friends, who have shot for years in the counties I have mentioned, told me that it was observable what a great decrease, or rather an almost fatal scarcity, of Golden Plovers had taken place this winter, and this was especially the case in their most favourite haunts. I hear of a similar noticeable scarcity of these birds from various parts of the North of Scotland, and also from the northern coast of Ireland.

I think, therefore, that there must have been a very universal migratory movement of Plovers from north to south this winter, which will account for the large flocks at present on the south coasts of England and Ireland; and no doubt Mr. Cordeaux's immense flock was composed of Scotch birds *en route* to the south.—ALEXANDER CLARK KENNEDY (late Captain Coldstream Guards).

THE BLUE THRUSH ERRONEOUSLY RECORDED AS A STRAGGLER TO IRELAND.—The Blue Thrush (*Monticola cyaneus*), first announced by Mr. Blake-Knox, in 'The Zoologist' (1870, p. 2019), as having been killed in Ireland, and noticed as such both in Messrs. Sharpe and Dresser's 'Birds of Europe' and in Prof. Newton's edition of Yarrell (vol. i., p. 295), has no claim, so far as our specimen is concerned, to be enrolled in the British Fauna. The specimen purchased for the Museum of the Royal Dublin Society, in November, 1866, was at that time supposed to have been shot in the county of Meath by a Mr. Brassington: but, after many enquiries, and the best assistance given by Mr. Glennon, and a long correspondence in all likely quarters, nothing more could be traced of its history. It was by a mere accident that the bird was, many years afterwards, recognised by my friend Dr. Battersby, of Lough Carragh, who expressed great surprise to see it in the Irish collection. Dr. Battersby then told me that he had himself brought this Blue Thrush, fresh-killed, from Cannes, where he was then residing; and when passing through Dublin had left it, during Mr. Glennon's absence, at his shop for a present. Dr. Battersby's name was no doubt imperfectly remembered by the shopman, and the bird, being fresh-killed, was too hastily assumed to be Irish. The locality, Meath, may have suggested itself as being the county in which many families of the name of Battersby reside. Dr. Battersby finds, from a memorandum, that he arrived in Dublin on the 14th November, 1866, and returned to Cannes on the 21st, a date which is consistent with Mr. Glennon's having received the bird on the 17th. No blame in the matter can attach to any of the parties concerned; it was a very natural mistake to make, and I feel much pleasure in being able so conclusively to explain the very unusual and perplexing circumstances of its history.—A. G. MORE (Science and Art Museum, Dublin).

[On turning to the page above indicated of Prof. Newton's edition of Yarrell's 'British Birds,' we find that although he notices Mr. Blake-Knox's report of the supposed occurrence of this bird in Ireland (as indeed he could hardly avoid doing) he by no means gives implicit credence to the report. On the contrary, he states that "the southern range of this species, even though it has occurred as a straggler in Heligoland, seems to render its enrolment as a 'British' bird inexpedient." We are glad to have the question now definitely settled.—ED.]

WHITE'S THRUSH NEAR WHITBY.—In the latter part of November, 1878, I received a Thrush which I could not make out or find described in any book on birds then accessible to me. It looked not unlike a young Missel Thrush, but its greater length and other peculiarities, such as the possession of fourteen tail-feathers, precluded its identification with that species. I have since shown it to one or two ornithologists, and your opinion, based on the description which I sent you, leaves me no longer in doubt that the bird is White's Thrush, *Turdus varius* of Pallas. It had killed itself by coming in contact with a telegraph wire, and had displaced and injured several of the neck feathers, but was otherwise in good condition. It has been preserved for the Museum here, and forms an interesting addition to our collection of county birds.—MARTIN SIMPSON (The Museum, Whitby).

[It will be in the recollection of our readers that a specimen of White's Thrush was procured at Hardacres, Berwickshire, in December, 1878, within a month of the capture of the one above-mentioned (Zool. 1879, p. 133). Possibly, therefore, these two birds may have travelled to this country in company.—ED.]

GOOSANDER ON THE EXE.—An adult male *Mergus merganser*, Linn., was shot on the river, near Countess Weir, on the 10th inst. This is an extremely rare bird in the western counties in adult plumage. We have in this Museum a fine old male, shot near Exeter, about 1810, from the collection of Mr. Robert Cumming, but that and the present specimen are the only adult examples I know of as having occurred in Devonshire. Immature specimens occur now and then in severe winters. I obtained a young male in 1856, and others have occurred in the neighbourhood at long intervals. It is unfortunate that the beautiful buff or salmon colour of the plumage of the under parts of the adult male, together with the carmine of the bill, and the rich orange of the legs and feet, disappear in stuffed specimens. The breast and belly become quite white after a time. The present specimen had hardly completed its moult, many of the feathers still retaining a portion of the sheaths. The bony labyrinth of the wind-pipe is well developed.—W. S. M. D'URBAN (Albert Memorial Museum, Exeter).

SNOW BUNTING, SPOTTED CRAKE, AND BITTERN AT LEISTON.—On the 11th November last I met with a rather large flock of Snow Buntings, on a barley stubble near here, about six miles from the sea. These birds are, I believe, seldom seen in this neighbourhood, except on the coast, where they are pretty regular winter visitors. Two Spotted Crakes were flushed by some snipe-shooters from a large piece of reeds at Leiston, last November, one of which was killed. On the 27th December my brother flushed a Bittern from some reeds near the sea-wall at Leiston; it rose close to his

feet. One of these birds was shot in a reed-bed near this spot about twenty years ago.—G. T. ROPE (Blaxhall, Suffolk).

SHORE BIRDS IN EAST- AND MID-LOTHIAN.—During the month of October the Firth of Forth was visited by large numbers of the Pomatorhine Skua. The flocks, indeed, in some cases, seem to have quite equalled in numbers those reported to have been seen off Redcar and other parts of the English coast. On the 25th I saw many specimens in the neighbourhood of North Berwick, and was fortunate enough to shoot two. Neither of my birds had the long tail-feathers. I have since seen others of these birds procured at Musselburgh and at Queensferry. Buffon's Skua also appeared in small numbers. A specimen was shot on October 20th near Drum, East Lothian, and a few days later another was picked up in a dying state on the shore between Portobello and Leith. Towards the end of October a Great Shearwater, *Puffinus major*, was shot by a fisherman near North Berwick. This bird was lately exhibited at a meeting of the Royal Physical Society of Edinburgh. I have also seen a Fulmar Petrel which was shot at Portobello on November 27th, and a Slavonian Grebe lately procured near Prestonpans.—C. CHAMBERS (339, High Street, Edinburgh).

RARE BIRDS AT HARWICH.—On the 10th, 12th and 22nd November three Richardson's Skuas were shot, one mature and two immature, and another mature bird was seen. On December 3rd three White-fronted Geese were seen, and two shot—a fine old gander and an immature bird. On the 5th a Hen Harrier was shot: it had just struck down a Black-headed Gull that was teasing it, killing it dead. The Harrier did not attempt to follow the Gull to the ground, and it was picked up by a man who then shot the Harrier. Three more were seen. On the 8th a Whooper was shot in the harbour. A good many Swans have been seen here this severe weather.—F. KERRY (Harwich).

BIRDS AND THE WEATHER.—The severe weather and excessive frosts which ushered in winter in the West of England have borne out a fact with reference to bird-life which may be worth recording, and that is, that no visitation of exceptionally hard weather is altogether uniform in its effects upon the feathered race. Snow has been present in more or less quantities in most parts of the kingdom, while it has been absent in West Somerset; and it is owing to this that, while we have had many birds among us in unusual numbers, such as Snipe and Woodcock, which have been driven from the snow-covered districts, we have been without those large flocks of Fieldfares and migrating Wood Pigeons which last year accompanied the heavy falls of snow. A peculiarity of the present winter with us is the almost total absence of the Fieldfare. Up to the present time I have only noticed three, and amongst the bunches of birds exposed for sale I have not detected one. The hard weather has sent a few Merlins into this district.

I saw one yesterday being bullied by a Rook; and an adult male was killed in one of the Taunton streets. The only variety which the winter has, to my knowledge produced up to this time in the West is a fine Spoonbill, which, towards the end of November, was obtained in the Northam Burrows, in North Devon—a locality where examples of this bird have been secured on several previous occasions.—MURRAY A. MATHEW (Bishop's Lydeard).

PEREGRINE FALCON NEAR WINDSOR.—On November 5th I received for preservation a Peregrine Falcon which was shot at Old Windsor, flying in a south-westerly direction. It is in mature plumage, but not having the grey back of the old male bird. I think it may be a bird some of your friends have lost, as there is a mark on the left leg just above the foot, as if rubbed by a leather strap. The tips of the tail-feathers are slightly worn.—E. CURTIS (Thames Street, Windsor).

SINGING POWERS OF THE GREAT GREY SHRIKE.—On December 6th a Great Grey Shrike was shot. When I first saw the bird, it was sitting on the telegraph-wires, from which it was disturbed by a passing train. I then went in search of it, and heard what to me was a strange warbling song, quite a combination of other birds' notes, followed at intervals by its own. I at once knew it was the bird I was searching for, and shot it.—F. KERRY (Harwich).

AMERICAN GREEN-WINGED TEAL IN DEVON.—My brother, Mr. R. P. Nicholls, purchased from a gunner, on November 23rd, a male specimen of *Querquedula carolinensis*, which he had just shot from an arm of the Kingsbridge Estuary. Although this bird closely resembles the European *Crecca*, Dr. Elliot Coues distinguishes them as follows:—"English Teal (*Crecca*).—No white crescent in front of the wing; long scapulars black externally, creamy internally. American Teal (*Carolinensis*).—A conspicuous white crescent on the side of the body, just in front of the bend of the wing; scapulars plain." This bird agrees in every particular with *Carolinensis*, as above described, as also with American skins, with which I have compared it. I am not aware if it has been before noticed to have occurred in Great Britain. Baird, in his 'North American Birds,' states it to be accidental in Europe.—HENRY NICHOLLS (Roseland, Kingsbridge, South Devon).

[In addition to the distinguishing characters above pointed out, we may add that the American species differs from the European bird in wanting the white streak which extends from the bill over the eye in the latter; and the white line below the eye is also nearly absent, being very indistinctly marked.—ED.]

AMERICAN GREEN-WINGED TEAL IN HAMPSHIRE.—Observing from a note in 'The Field' that a specimen of the American Green winged Teal was lately killed in South Devon, I am induced to record the fact that

I have in my possession one of these birds in excellent preservation, which was shot by my father more than forty years ago at Hurstbourne Park, Hants. The white crescent on the wing is very apparent and well defined.—ARTHUR FELLOWES (Burwood, Rotherfield, Sussex).

SCARCITY OF FIELDFARES.—The Fieldfare has scarcely put in an appearance here this season. Not more than four or five have been seen at any one time, and certainly not more than a dozen birds have come under my notice throughout the winter. It is the more remarkable as there has been a superabundance of haws and other hedge-fruit. Thrushes and Blackbirds have been numerous as usual, and Redwings in extraordinary numbers.—J. KING (Langford Road, Biggleswade).

UNUSUAL MIGRATION OF JAYS.—One day during the last week of October last the inhabitants of the little bay of St. Margaret's were startled by the sudden appearance of a flock of between two and three hundred Jays, which rested for awhile in the vicinity, and then dispersed inland. No doubt the extreme cold then prevailing in the East of Europe was the cause of their immigration.—ARTHUR W. CRICHTON (26, East Cliff, Dover).

THREE-LEGGED MAGPIE.—On November 3rd Mr. Myers, of Po House, Silecroft, Cumberland, shot a Magpie with three legs. The third leg, which is perfectly formed, is smaller than the others, and grows close to what may be styled the right leg, and is white in colour, as are also the claws.—CHARLES A. PARKER (Gosforth, Carnforth).

LATE NESTING OF THE BARN OWL AND WATERHEN IN NORFOLK.—As a proof of the lateness of the past nesting season, I saw two nestling Barn Owls on November 21st, which had been taken out of Ryburgh Church tower. I could not exactly say how old they might be, but they were evidently very young. The same week—viz., on the 26th—when shooting near Holt, I saw a half-grown Waterhen, only able to fly a yard or two.—J. H. GURNEY, Jun. (Northrepps, Norwich).

LITTLE GULL, FULMAR PETREL, AVOCET AND SHEARWATERS.—I beg to record the occurrence, during the past autumn, of the following birds:—September 3rd, *Larus minutus*, immature, given me by a friend; shot at Scarborough. October 11th, *Fulmarus glacialis*, fine mature specimen, obtained from a local birdstuffer; shot off the coast of Hull. November 3rd, *Recurvirostra avocetta*, female, weight fourteen ounces; shot at Stornoway. December 11th, *Larus glaucus*, immature; shot off the coast near Hull. *Lestris parasiticus* and *pomatorhinus*, many of the former have lately been received by the birdstuffers of Birmingham, but only one or two of the latter; I know of about fifteen specimens in all.—ROBERT W. CHASE (Birchfield, near Birmingham).

MARTINS IN DECEMBER.—On the 18th and 19th November last, the afternoon being warm and bright, I saw a Swallow flying about the College grounds. I watched it for some time on both occasions, so am quite sure I was not mistaken. This is not the latest stay of Hirundines that I can remember. On December 3rd, 1873, a remarkably warm day, I saw three Martins flying about in the grounds of St. John's College, Cambridge. What would probably happen in cases like this? Do the birds migrate or do they linger on till cut off by the cold?—M. VAUGHAN (Haileybury College, Hertford).

[They probably perish for want of food.—ED.]

NORTHERN STONE CRAB.—I have recently received for the Royal Aquarium several consignments of the Northern Stone Crab, *Lithodes arctica*, from the Northumberland coast, where it occurs not infrequently. Both sexes are represented, and may easily be defined by the curious arrangement of the abdominal segments of the female. Most of the females are now carrying their ova, which appears to be well developed. I shall be glad to communicate with any student of Marine Zoology, for I frequently have duplicate fresh specimens which might be useful, and which are dead on arrival from the coast.—JOHN T. CARRINGTON (Royal Aquarium).

KNOTTY CUSHION STARFISH.—Mr. E. Howard Birchall, of the Tyne-mouth Aquarium, has forwarded to me, for this Aquarium, about a dozen very beautiful examples of the Knotty Cushion Starfish (*Goniaster equestris*), taken off the Northumberland coast. The late Prof. Edward Forbes, in his 'History of British Starfishes,' describes this species as "one of the rarest and most beautiful of our Starfishes." The specimens sent by Mr. Birchall are pretty even in size, and from six to eight inches in diameter. They are of a rich orange-red colour; but I fear that none of the specimens are sufficiently "strong alive" to hope for their recovery after their long journey from Shields to London.—JOHN T. CARRINGTON (Royal Aquarium, Westminster).

EPPING FOREST AND COUNTY OF ESSEX NATURALISTS' FIELD CLUB.—A meeting for the foundation of this Association, the objects of which had been made known by advertisements and circulars, was held on the 10th January, in the rooms of the Art Classes, at Buckhurst Hill, Mr. R. Meldola, Secretary to the Entomological Society of London, in the chair. A resolution to found the Club was proposed by Mr. N. F. Robarts, seconded by Mr. W. C. Barnes, and carried unanimously. Draft rules, carefully drawn up by Mr. C. Browne, M.A., barrister-at-law, to meet the objects of the promoters,

were then read and discussed. The principal points are as follows:—The Club is established for the study and investigation of the Natural History, Geology, and Archæology of the County of Essex, special attention being given to the Fauna, Flora, Geology, and Antiquities of Epping Forest; the publication of the results of such investigations; the formation of a museum and of a library of works of local interest and other publications; and the diffusion of information on natural science and antiquities. Members' subscription (both for ladies and gentlemen) was fixed, after considerable discussion, at 10s. 6d. per annum, members living beyond a radius of fifteen miles from the head-quarters to pay 7s. 6d. annually. Persons joining the club within two calendar months from its formation to be considered original members. In addition to the ordinary meetings of the club it was agreed to hold field meetings in different parts of the county, at the discretion of the Council, who may appoint lecturers and make such arrangements as they may deem best for the convenience of members and friends. An important rule, which met with much approval, runs as follows:—"The Club shall strongly discourage the practice of removing rare plants from the localities where they are to be found or of which they are characteristic, and of risking the extermination of birds and other animals by wanton persecution; and shall use its influence with landowners and others for the protection of the same, and to dispel the prejudices which are leading to their destruction. The rarer botanical specimens collected at the field meetings shall be such as can be gathered without disturbing the roots of the plants; and notes of the habits of birds shall be recorded instead of collecting specimens or eggs." This rule is not intended to restrict the judicious collecting of specimens necessary for their studies by individual members. The rules having been passed and ordered to be printed, the meeting proceeded to elect as officers—President, Mr. Raphael Meldola; Treasurer, Mr. H. J. Barnes; Secretary, Mr. William Cole; Librarian, Mr. W. J. Argent. The following gentlemen were chosen to form the Council of twenty-five members:—Dr. E. B. Aveling, R. L. Barnes, W. C. Barnes, E. N. Buxton, John T. Carrington (Naturalist to the Royal Aquarium, Westminster, and Editor of 'The Entomologist'), R. M. Christy, P. Copland, E. A. Fitch, Rev. James Francis, G. J. Godwin, Herbert Goss, J. C. Harcourt, Francis George Heath, H. B. Hooper, J. P. Hoare (Author of a 'History of Epping Forest'), Andrew Johnston (Verderer of Epping Forest), Alfred Lockyer, Nathaniel Powell, Hildebrand Ramsden, M.A., Rev. C. J. Ridgeway, N. F. Robarts, W. G. Smith (Hon. Sec. Epping Forest Fund), C. E. Taylor, Rev. W. Linton Wilson, M.A., T. J. Woodrow. In the list of original members were Prof. C. C. Babington, Col. Makins, M.P., H. T. Stainton, Frank Crisp (Secretary Royal Microscopical Society), Arthur Lister, J. W. Dunning, M.A., W. Fowler, Frederick Young (Chairman of Epping Forest Fund), J. Eliot Howard, Mrs. Barclay, David Howard

(Walthamstow), F. W. Cooper, Ferdinand Grut (Librarian Entomological Society), &c. Many other literary and scientific men of eminence have also promised aid in various ways. At the close of the meeting, the Secretary requested all intending members to send their names to him at once, at Laurel Cottage, Buckhurst Hill.

PROCEEDINGS OF SCIENTIFIC SOCIETIES.

LINNEAN SOCIETY OF LONDON.

December 18, 1879.—Prof. ALLMAN, F.R.S., President, in the chair.

Mr. H. Seebohm was elected a Fellow of the Society. Three Associates were also balloted for and elected, *viz.*, Messrs. A. D. Bartlett (Superintendent Zoological Gardens), N. E. Brown (Kew Herbarium), and F. H. Waterhouse (Librarian Zoological Society).

Professor Allman gave a notice of some researches in connection with what appeared to him to be true sense organs in the Hydroids. He drew attention to the fact of his having some years ago (Phil. Trans. 1875) described the occurrence in *Myriothela* of certain remarkable pedunculated sacs which are found in the spherical capitulum of the tentacles, where they are in connection with a bulbous mass composed of radiating filaments. These filaments admit of a comparison with the rod-like bodies characteristic of special sense organs in higher animals; and the whole structure was believed by the author to represent in *Myriothela* an apparatus of special sense. For these pedunculated sacs Prof. Allman proposes the designation of "Podocysts," and he now believes that in more or less modified forms they are more widely distributed among the *Hydroidea* than he had supposed when he described them in *Myriothela*. He would refer to the same group of bodies the pedunculated thread cell-like sacs which in the form of four pencils terminate the four lobes which surround the mouth of the planoblast in *Podocoryne* (see 'Gymnoblasic Hydroids,' pl. xvi, figs. 6, 7). Here, however, instead of being immersed in the surrounding tissues, they stand out free from the surface and are bathed on all sides by the water. Each sac is furnished with a minute terminal style, as in *Myriothela*. Whether the very singular pedunculated sacs with which the tentacles are armed in the planoblast of *Gemmaria* (Hydroids, Ray Soc., pl. vii, figs. 3, 4) must be placed in the same general category with the "podocysts" of *Myriothela* is not at present so evident. Instead of containing, as in the latter, a single thread-cell-like body, the sacs of *Gemmaria* enclose several oval capsules, while the terminal style of the podocyst of *Myriothela* is here replaced by a pencil of long vibratile cilia. The peduncle of the sac, moreover, is in *Gemmaria* eminently contractile, at one time extending itself to a great

length, and again becoming so much shortened as to bring the sac which it carries on its summit almost in contact with the tentacle of the planoblast. Notwithstanding, however, these differences, the correspondence is still so close as to suggest a similar significance.

A paper was read by the Rev. J. M. Crombie "On the Lichens of Dillenius ('Historia Muscorum'), as illustrated by his Herbarium;" and other subjects of botanical interest were brought forward.—J. MURIE.

ZOOLOGICAL SOCIETY OF LONDON.

December 16, 1879.—Prof. FLOWER, LL.D., F.R.S., President, in the chair.

The Secretary read a report on the additions that had been made to the Society's Menagerie during the month of November, amongst which special attention was called to a fine example of the King Penguin, *Aptenodytes Pennanti*, purchased November 14th.

Mr. H. Seebohm exhibited, and made remarks on, a collection of birds made by Captain the Hon. G. C. Napier, in the Valley of the Atreck, near the south-east corner of the Caspian Sea.

Mr. R. G. Wardlaw Ramsay exhibited a specimen of *Pericrocotus flammeus*, in an abnormal state of plumage, obtained on the Neilgherry Hills in Southern India.

Mr. Sclater exhibited a small collection of birds from the island of Montserrat, West Indies, received from Mr. J. E. Sturge, of that island. This collection, though small, was of much interest, as nothing was previously known of the Ornithology of Montserrat.

Mr. T. Jeffrey Parker read a paper on the intestinal spiral valve in the genus *Raia*. Mr. Parker showed that there were four types of valve exhibited in individuals of that genus, differing from one another in morphological characters, in the extent of absorption surface presented to the food, and in the resistance offered to the passage of food.

A communication was read from the Marquis de Folin "On the Mollusca of the 'Challenger' Expedition of the genera *Parastrophia*, *Watsonia* and *Cæcum*."

Prof. W. H. Flower read a communication on the cæcum of the Red Wolf, *Canis jubatus*, in which it was shown that that animal differed from the majority of the *Canidæ* in possessing a very short and perfectly straight cæcum.

A communication was read from Mr. Edward Bartlett, containing a list of the mammals and birds collected by Mr. Thomas Waters in South-East Betsileo, Madagascar. The collection contained a new species of rodent belonging to the genus *Nesomys*, and two new species of birds of the genera *Cypselus* and *Zapornia*.

Dr. A. Günther read the description of a new species of dwarf Antelope, obtained by Dr. Kirk near Brava in the South Somali country. Dr. Günther proposed for this new species the name of *Neotragus Kirki*.

A communication was read from Mr. Martin Jacoby, containing the description of new species of *Phytophagous Coleoptera*.

A communication was read from Prof. J. Reay Greene, on a remarkable Medusa, *Charybdea haplonema*, from Santa Catharina, Brazil.

Mr. Edward R. Alston read a description of a skull of a Chamois with four horns, which had been exhibited at a previous meeting of the Society.

Mr. Henry Seebohm read a paper "On certain obscure Species of Siberian, Indian and Chinese Thrushes.—P. L. SCLATER, *Secretary*.

NOTICES OF NEW BOOKS.

Biologia Centrali-Americana. Edited by F. D. GODMAN and OSBERT SALVIN. 4to. London: published by the Authors.

UNDER this title Messrs. Godman and Salvin have commenced the publication of a series of quarto volumes upon the Fauna and Flora of Mexico and Central America—*i. e.*, the whole of Mexico from the valleys of the Rio Grande and Gila on the north, the five Central-American States of Guatemala, Honduras, San Salvador, Nicaragua, and Costa Rica, British Honduras, and the Colombian State of Panama as far south as the Isthmus of Darien. During the past twenty-two years the Editors have been collecting materials for this work. They have themselves visited parts of the country, and spent several years there; and during the whole of the above period they have received collections from correspondents, and from naturalists specially employed in visiting many of the previously unexplored districts. The materials thus obtained have been partly retained by the Editors in their own collection, and partly so distributed as to be most readily available for the present work. In addition to these materials, the Editors propose that all specimens obtained by other travellers should be examined, wherever they may be accessible, so as to make the work as complete a record as possible of what is known of the animal and vegetable life of the country under investigation.

We learn from a Prospectus of the work that it will be issued in zoological and botanical parts, each containing an average of

six plates. Those relating to Zoology will contain portions of several subjects. The botanical parts will contain no other subject. It is believed that the work will extend to about twelve volumes of 500 pages each, of Zoology, and twenty parts of Botany.

Two parts of this work have already appeared. In Part I. the Monkeys of Central America, of which there are said to be at least eleven species, are described by Mr. Alston, and two of them, *Mycetes villosus* and *Chrysothrix oerstedii*, are figured. Mr. Alston also contributes the first instalment of an account of the Bats of the region in question, the conclusion of which appears in Part II., with two plates. Messrs. Godman and Salvin, undertaking the Birds, have commenced in Part I. with the order *Passeres*, suborder *Oscines*, and begin their long list with the Thrushes, figuring three species; and in Part II. a fourth, *Turdus nigrescens*, which looks uncommonly like our old friend the Blackbird. The sexes, however, of this species are said to present scarcely any difference in plumage.

In the class Insects, Part I. contains an instalment on the *Rhopalocera*, which is continued in Part II., with, altogether, four beautifully drawn plates.

Mr. W. H. Bates, in Part II., commences the *Coleoptera*, and two plates are given of the species described by him.

Hitherto a knowledge of the fauna of Central America has been possessed only by the few who have specially directed their attention towards this zoologically rich subregion. The general public, and indeed the majority of naturalists, may be said to know little or nothing on the subject, for they have had no means of information beyond the scattered papers which have appeared at intervals in the 'Proceedings of the Zoological Society' (chiefly lists of species collected, with the collector's notes appended), and these have only served to show what a wonderfully rich field awaited exploration by naturalists, and how much a comprehensive work on the fauna and flora of such a country was needed. This desideratum is at length to be supplied, and in a most satisfactory manner, if we may judge by the first two parts which have been issued of the work now in progress. The undertaking is a most onerous one, involving an amount of personal labour, and a sacrifice of time, trouble, and expenditure, which none but the most enthusiastic naturalists,

having the interests of science alone at heart, would care or consent to bestow. We trust that the authors will receive that hearty support which they have a right to expect from those for whose benefit they are so laboriously and so generously working.

The Ascent of the Matterhorn. By EDWARD WHYMPER. With Maps and Illustrations. London: Murray. 1880.

If a description of Nature in one of her wildest and grandest moods comes fairly within the term Natural History, then is Mr. Whympers new book entitled to a notice in these pages. On looking through the volume, however, it is apparent that the author's object was not to investigate the fauna of the Alps, and indeed had it been so he would have been but poorly repaid for his toil, seeing how little animal life is to be found in the snow-clad regions explored by him, and how much is already known concerning the few *feræ naturæ* which exist there. His mind was engrossed with problems of a very different—and, to him, weightier—kind than those which, under similar circumstances, would have occupied the attention of a naturalist. It must not be supposed, however, that Mr. Whympers was indifferent to the charms of Zoology, for he did not fail to notice and to observe the actions and habits of such animals as chance brought in his way; and we know from his published accounts of travel in other lands, that his powers of observation and description are of no mean order.

When traversing some of the wildest portions of the Alps, he could hardly fail to notice the Chamois, which in certain localities are still tolerably numerous, though seldom permitting a very near approach. On one occasion, however, he obtained an excellent view of a large herd, which he thus describes:—

“Whilst we were resting at this point (the Col which commands a glorious view of the southern side of Monte Rosa, and of the ranges to its east), a large party of vagrant Chamois arrived on the summit of the mountain from the northern side, some of whom—by their statuesque position—seemed to appreciate the grand panorama by which they were surrounded, while others amused themselves, like two-legged tourists, in rolling stones over the cliffs. The clatter of these falling fragments made us look up. The Chamois were so numerous that we could not count them, and clustered round the summit, totally unaware of our presence.

They scattered in a panic, as if a shell had burst amongst them, when saluted by the cries of my excited comrade, and plunged wildly down in several directions, with unfaltering and unerring bounds, with such speed and with such grace that we were filled with admiration and respect for their mountaineering abilities."

Facing this description is a full-page illustration, by Mr. Wolf, of a group of Chamois, which to our thinking is one of the most attractive engravings in the volume. The life-like attitudes and startled expressions of the animals, the timid action of the kid which essays to follow its mother down a precipice, and the fidelity to Nature in the rendering of the mountain gorge in which they are grouped, imparts an air of wildness to the picture, and excites in us a feeling of admiration which is seldom or never called forth by a contemplation of the works of other zoological artists. Quite as beautiful is the vignette, on page 102, of two "Chamois in difficulties" as they descend the almost perpendicular face of a cliff. The *pose* of the animals strikes us as being graceful, and at the same time perfectly natural, the peculiar shape of the animal's foot, so well adapted for climbing, being admirably depicted.

On the previous page Mr. Whymper describes his discovery of a dead Chamois half way up the southern cliffs of the Stockje:—

"We clambered up, and found that it had been killed by a most uncommon and extraordinary accident. It had slipped on the upper rocks, had rolled over and over down a slope of *débris* without being able to regain its feet, had fallen over a little patch of rocks that projected through the *débris*, and had caught the points of both horns on a tiny ledge not an inch broad. It had just been able to touch the *débris* where it led away down from the rocks, and had pawed and scratched until it could no longer touch. It had evidently been starved to death, and we found the poor beast almost swinging in the air, with its head thrown back and tongue protruding, looking to the sky as if imploring help."

We pass over the many spirited descriptions of Alpine scenery which are to be met with throughout the book, since they scarcely come within the scope of our notice. Moreover, the style of Mr. Whymper's narrative will be familiar to those who are acquainted with his 'Scrambles among the Alps,' of which the present volume appears to be a condensed edition, with some new additions and several new illustrations. It is beautifully got up

as regards type and paper, and, besides being an admirable guide-book for aspiring tourists, enables those who stay quietly at home to form a very good idea of the grandeur of Alpine scenery.

Nature cared for and Nature uncared for; a Lecture on Ornithology.

By H. B. HEWETSON. 8vo. pp. 36. London: West, Newman, and Co. Leeds: R. Jackson. 1879.

To a rural audience in a remote Yorkshire village, chiefly known to fame as embosoming the home of the late Charles Waterton—a name familiar to naturalists—Mr. H. B. Hewetson delivered the lecture which in a printed form now lies before us.

Although containing nothing very novel or striking, it has the merit of pointing out to those who may be yet unconvinced, or who may never have given the subject a thought, some of the pleasures and advantages to be derived from a study of Natural History. The discourse is enlivened by a sketch of the life-history of three very familiar birds, whose portraits, copied from Bewick and Wolf, appear in the form of etchings. In advising people to use their powers of observation, Mr. Hewetson offers some sensible remarks, from which we take the following as an example:—

“It is not the abundance of opportunities which makes men great; it is the use they make of few advantages. It is not the confused mass of dry facts which is being daily crammed into the undeveloped brains of our children which will make us a wiser nation. This can only be obtained by our energies being directed towards showing them what to love and what to care to learn; consulting always, as far as possible, a child's temperament and inclination, and never forgetting that England's greatness, in a large measure, depends for its continuance, as it has had to be indebted for its rise, to the brains of early dunces. * * * * It is not everybody who cares for birds, or stones, or shells, or butterflies, or flowers, but there is not one of us who can say, if he dare, that any object in Nature is beneath his notice, even though it may be in itself uninteresting in comparison with what in the scale of beauty is more lovely and admirable. It is but a part of one harmonious whole; a silent proof of the great Creator's powers, as incomprehensible when exerted in the creation of the meanest worm that crawls in the dust beneath our feet, as it is in the vast ordination of myriads of worlds displayed to our eyes in the starry heavens, illimitable and inconceivable.”

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ON THE OCCURRENCE OF THE NEEDLE-TAILED SWIFT FOR THE SECOND TIME IN ENGLAND.

By G. B. CORBIN.

So far as I am aware, but a single instance of the occurrence of this species in the British Islands has been hitherto recorded. In July, 1846, a specimen shot at Great Horkesley, near Colchester, was forwarded (in the flesh) for preservation to the late Thomas Hall, birdstuffer, of the City Road, and while in his hands was examined by Messrs. Yarrell, Doubleday, and Edward Newman, and was recorded in 'The Zoologist' for that year.*

The rarity of its visits to Western Europe is hardly to be wondered at, seeing that its true home is in Eastern Siberia, whence it migrates into India, Persia, China, and Australia, where it is found as a winter visitant. Its powers of flight must be truly marvellous to enable it to traverse the vast intervening space which separates these countries from the British Islands.

I have now the pleasure to record its recent occurrence in Hampshire. The unusual abundance of Swifts in many localities during the summer of 1879 has been the subject of remark in these pages, and in this neighbourhood they were extremely numerous. On the evening of July 27th I saw two strange birds flying about over the river in company with Swifts; but they kept a long way off, so that I could see nothing very peculiar about them, except that they appeared to be larger than the rest

* 'Zoologist,' 1846, p. 1492. See also 'Zoologist,' 1863, p. 8329.

of the company, and their flight, although resembling that of their fellows, was somehow different.

My curiosity was awakened, and the next evening I was at the same place watching for the strangers, but the dull cold weather prevented my seeing them. In the course of a week, however, I had the gratification of seeing one so near that the white throat, the white under the tail, as well as the pale patch on the back, were plainly visible. I noticed then that it sought its food indiscriminately amongst the Swifts, Swallows, and Martins, and was not particular about confining itself to one stratum of atmosphere as the other species did; for it is well known that if Swifts and other species are feeding at the same time they seldom mingle with each other, or occupy the same height in the air. I also observed that the bird in question often had a sort of poising flight, reminding one of the Nightjar, but at other times it had an equal, if not superior, dash of wing to the Common Swift; and I could well understand this when, a few days later, I held in my hand what I have every reason to believe was one of the two birds I had seen, for its length of wing, coupled with its superior weight, would give it such an impetus as I have described. It was killed about the 26th or 27th of July, whilst flying over the river, about two miles from where I first observed it, and what I suppose was its mate, but the man who shot it did not see another like it.

Altogether this interesting stranger is a handsome bird. It measured seven inches and three-quarters from its beak to the end of the spines of its tail, and the wings when closed extended nearly three inches beyond them. The wings themselves measure eight inches from the carpal joint to the tip of the longest quills; the two outer quills are of equal length, and the longest in the wing. The beak is short and black, rather broad at the base, and the nostrils are somewhat large; from the tip of the beak to the inside of the gape it measures three-quarters of an inch. Its eyes, which were of a very dark brown hue, appeared sunken, in consequence of the feathers of the head seeming to overhang them; and this appearance was not due to the bird having got stale, for it was quite fresh when I had it, and the eyes were bright and life-like. Its legs are short, toes rather long, and the claws very much curved, and a peculiarity about the foot is that the hind toe is not situated at the back of the leg, but on the

inside, so that the outer and hind toes seem to be in a line with each other. Legs and toes brown; claws paler. The forehead and throat, as well as the under tail-coverts, are white; and there is a broad irregular line of the same colour extending from the tail to the thigh. The head, neck, wings, and tail are black or very dark brown, with very beautiful shades of green and purple in different lights. In the centre of the back is a very pale patch, almost white in the middle, but shading off to a pale brown as it reaches the dark tail and brown breast, and under parts. The inside webs of the quill-feathers of the wing are also of a pale brown or grey; in fact the two or three nearest the body are quite white, and were visible when the bird was flying, and even conspicuous when the wings were closed.

The chief characteristic feature in the bird is that from whence it takes its name—*viz.*, the spines of its tail. The feathers of the tail are almost of equal length and ten in number, the shaft of each being prolonged beyond the webs nearly a quarter of an inch in the six middle ones, but not quite so long in the other four. The needle-like spines, which end in a sharp point, are stiff, black, and shining, like the shafts, of which they are a continuation.

The weight of the bird was just under three ounces, and the body was plump and well-conditioned, indicating that it had been living well. I examined the stomach, and found it contained a comparatively large mass of insect remains, amongst which portions of the common wasp were very conspicuous, the hard horny thorax of two of these creatures being intact. Amongst the mass also were the two fore-wings of some moth, so doubled and rubbed that I could not recognise the species at first, but on a closer inspection I have not much hesitation in saying they belonged either to *Leucania pallens* or *L. impura*; and as these two species of moths naturally inhabit a damp or marshy situation, I am probably correct, although, as far as my experience goes, they seldom fly in the daytime, and yet I suppose the bird must have taken them on the wing like the rest of its food. From the fact of wasps forming part of the diet, it seems that even stinging insects are not objected to, but possibly anything of the kind on the wing is readily taken by this bird, and when the mouth is open it would be capable of securing an insect of considerable size. That this bird was a general feeder

is quite certain, for, besides what I have mentioned, there were several wing-cases of some small Coleoptera in the stomach.

I am unable to say what became of the other bird I saw on the evening when I first observed them, but that it was one of the same species I feel sure.

[This specimen, now carefully figured by Mr. F. W. Harris, we have had the pleasure of examining, and it was exhibited by Professor Newton at a meeting of the Zoological Society on the 6th January last. Although described by Mr. Gould, in his 'Birds of Australia,' as "the largest of the *Cypselidæ* yet discovered," it does not strike us as differing much in size from the better known Alpine Swift. Like that species it has a white throat; but, unlike it, instead of a white belly it has the under tail-coverts white, and this white extends up the flanks, giving the bird the appearance of having white sides. A remarkable feature also is the very pale coloration of the back, which may be described as smoke-grey, contrasting strongly with the sooty black wings.

Mr. Gould, who had opportunities of personally observing this species in Australia, and of examining recently killed specimens, states that the keel of the sternum, or breast-bone, is unusually deep, and the pectoral muscles more developed than in any other bird of its weight. Its powers of flight he describes as truly amazing. He never saw it perch, and it rarely flew sufficiently low to be secured by a shot, being, with the exception of the Crane, the most lofty as well as the most vigorous flyer of all the birds he observed in Australia.

We may remark that, although generally called "Spine-tailed," the oldest distinctive English name is "Needle-tailed," proposed by Latham.* The generic name *Acanthyllis* (usually, but erroneously, written *acanthyllis*) is derived from *ακανθυλλίς*, a diminutive form, but having the same signification as *ακανθίς*, meaning "thorny" or "prickly," and appropriately refers to the remarkable character of the tail-feathers as above described. What the particular use of these feathers may be can, at present, be only conjectured, since we are without any information on the subject; but since Jerdon has stated, on the authority of the late Col. Tickell, that this Swift breeds among the huge wall-

* The Needle-tailed Swallow, Latham, Gen. Syn. Supp., vol. ii., p. 307; and Pin-tailed Swallow, Latham, Gen. Hist. Birds, vol. vii., p. 208.

like crags of the Himalayas, it is not unreasonable to suppose that the needle-like extremities of the rectrices may subserve a similar purpose to the stiff tail-feathers of the Woodpeckers, and enable this bird to cling with greater security to the crags amongst which it builds. It is remarkable that, with the exception of the specimens observed in England, none are recorded to have been met with in Europe.—ED.]

ON THE DECREASE IN SCOTLAND OF THE GREATER SPOTTED WOODPECKER.

BY J. A. HARVIE-BROWN.

MANY accounts are to be found of the former occurrence of the Great Spotted Woodpecker as a nesting species in Scotland, more especially in the ancient forests of Rothiemurchus, Tarnaway, and Spey, and of Strathglass and other portions of Invernesshire, along the banks of the Caledonian Canal, and Loch Ness-side. It will be unnecessary, therefore, to adduce evidence of the fact,—although I possess a considerable amount of material for the purpose,—but a few remarks suggest themselves.

First, this bird does not seem to have been a widely or generally recognized species as a resident in Scotland, even at the comparatively early date of 1791—96, for no records of its occurrence during summer are given in the ‘Old Statistical Account of Scotland,’ although it is mentioned as an autumn visitant.* Even so late as 1840, MacGillivray wrote of it as “in all parts rare,” though “a permanent resident.”†

Evidence, however, of its abundance, or presence, in these parts of Scotland may be gleaned from Stuart’s ‘Lays of the Deer Forest,’ Rev. Lachlan Shaw’s ‘History of the Province of Moray,’ and many other sources—both published and unpublished. Sir Dudley Majoribanks, Bart., who has assisted me with much interesting correspondence on this and kindred subjects, writes:—“Hugh Frazer says it was a favourite cage-bird, and that the Priest at Glassburn—seven miles from here, *i.e.*, from Guisachan

* ‘Old Statistical Account,’ 1791-6. An old record well worthy of consideration.

† ‘British Birds,’ vol. iii., p. 80. 1840.

House—taught one to perform all sorts of tricks.* He fixes this at forty years since.” Sir D. Majoribanks also states that both Frazer and Rory MacDonald “say that the bird was common previously to 1851, but neither can fix the time of its disappearance, or when it began to grow of scarce occurrence.” He adds, “I have no manner of doubt about the Woodpecker being *Picus major*, and I can state most positively that the holes, pointed out to me as the work of the Woodpecker, were quite capable of admitting any British Squirrel (more especially ones of this district), being the size of ordinary rat-holes.” Another reason assigned for the decrease and total disappearance of the species is, that, after smuggling came in, the smugglers made use of the decayed trees for firing, which the proprietors winked at so long as they did not touch the sound trees; but this cannot be held widely and generally applicable, or sufficient in itself to account for their present scarcity. In 1855 there were “hundreds and hundreds of white trunks of firs burnt and drying within a mile of this house.”

The Rev. George Gordon, of Birnie, in his ‘Fauna of Moray,’† states that—“Two specimens were procured in 1838, by Mr. Wink, from the woods of Castle Grant, which it has long been known to inhabit.” Mr. Gordon, writing to me later, adds, “I can well recollect that Mr. Wink, when I asked him, had no doubt of getting specimens from the gamekeepers, which he did.”

During the breeding season of 1867-68, Mr. R. Gray‡ examined specimens shot in Banff-, Aberdeen-, and Inverness-shires. The last shot at Guisachan was got in the spring of 1869, by one Henderson, as I am informed by Sir Dudley Majoribanks.

All my own notes of its occurrence since that date refer to its appearance in winter. There are still numerous traces of its “boring” and “tapping” at Guisachan; and at Carr Bridge, and on Speyside generally.

In no instance can any of my witnesses, now living, state precisely at what time the bird began to get scarce, nor can any

* Stevenson, in his ‘Birds of Norfolk,’ also makes mention of the fact that this species “thrives well in confinement,” and is “very active and mischievous” (*op. cit.* vol. i., p. 291), and I have other evidence of the fact that this bird was a favourite cage-bird in Scotland before it became scarce.

† ‘The Zoologist,’ 1844, p. 510.

‡ ‘Birds of the West of Scotland,’ p. 190.

of them, with one exception, suggest any reason for such decrease. The general opinion, widely current in Invernessshire, is that Squirrels were the primary cause of this decrease, but only one writer has attempted to describe the *modus operandi* by which this was effected.

Mr. C. Y. Michie, in his Prize Essay upon 'Diseases of Forest Trees,' written in 1865, says:—"Where Squirrels are most numerous Woodpeckers are most scarce. In conversation with a sawyer, a man of observation, a few days ago, he told me that near to a saw-pit where he was at work a Woodpecker hatched its eggs, and when the young ones were nearly full-fledged, he observed, one morning, a Squirrel enter the nest and carry off a young bird: this was again and again repeated by the Squirrel till the whole brood was destroyed. It is now," continues Mr. Michie, "pretty generally known that Squirrels eat the eggs of Wood Pigeons, from which it may pretty safely be inferred that the eggs of the Woodpecker and other insect-devourers will share a similar fate." Mr. Michie also makes the statement that, where Squirrels abound, a *certain insect* commits the greatest ravages. He then tells us:—"In Strathspey, about twenty years ago, Woodpeckers were very numerous; the holes which they bored in the trunks of the old trees may be seen at the present time in hundreds, whilst now, not a single Woodpecker is to be seen in the whole Forest. About the year 1840,* the first Squirrel was seen in Duthell Forest; and now they are seen in hundreds and appear on a rapid increase."

In this essay Mr. Michie clearly proves his case against the Squirrel for damages done to trees; but the evidence of its destructiveness to the eggs and young of the Woodpecker is not so clear in my estimation. Not that I doubt the solitary instance related above, for there is other satisfactory evidence that Squirrels do occasionally carry off eggs and young birds, and the nest of the particular Woodpecker referred to may possibly have been more than usually accessible. But I wish to combat the general impression which is said to prevail in the district referred to, that this is a common or frequent habit of the Squirrel. I am quite of the opinion expressed by Prof. Newton in letters to me, that the holes made by the Great Spotted Woodpecker are, as a

* This date is one of many which go to prove a natural resuscitation of the Squirrel in the Valley of the Spey.

rule, not large enough to admit the body of a Squirrel, if indeed they ever are. Indeed, as Prof. Newton adds, I doubt if even the nesting-holes of *Picus viridis* are sufficiently large to admit the body of a Squirrel. Moreover, I have good reason to believe that the taste acquired by the quadruped for birds' eggs is not a general one, but only acquired by comparatively few individuals, much blame having attached to it from a judgment founded upon isolated instances which have come under the notice of a—comparatively speaking—small number of observers. There is some evidence of the taste being acquired, in the first instance, from the inquisitiveness of the animal which leads it to carry to its “dray” any unusual-looking objects. Birds' heads and wings have been found in Squirrels “drays,” and the conclusion has been drawn—I think somewhat hastily—that they were brought there solely for the purposes of food. It is more likely that some truly carnivorous animal—such as a Stoat or Weasel—had killed the bird, and, when it finished its meal and retired, left the head. The Squirrel, from sheer curiosity, descended and carried off the fragments. Squirrels, as has been well ascertained, eat *Fungi* of several species, but there are others which, although it does not eat, it carries up trees and sticks into clefts of the branches. I have collected much evidence in support of this fact. I agree also with the opinion expressed by several correspondents—notably Captain Dunbar Brander, of Pitgaveny, who lives in the centre of the district, where the prejudice against the Squirrel is perhaps strongest, that:—“Some few Squirrels have learned that eggs are good, and will destroy them; the great majority do not. One dog in ten will eat an unbroken egg; one cat in fifty has found out that eggs can be broken. There is nothing a cat likes more than an egg, but it must be broken for her. . . . Though often trapped with an egg, that proves nothing. Squirrels are inquisitive. . . . Birds are not generally afraid of a Squirrel, nor—*except in isolated instances*--do they give battle to or attack Squirrels, though these isolated instances, coming under an observer's notice, are very liable perhaps to cause him to judge ill of the species collectively.”

The published references to the “carnivorous and oophilous propensities of the Squirrel” are very numerous, and would fill some pages of ‘The Zoologist.’ It is not my object here to discuss further this general accusation, but rather to shield the

Squirrel from the more particular accusation as regards the Woodpecker.

We have still to consider what causes have been at work in influencing the decrease of Woodpeckers in the North of Scotland. In England, I understand, one reason given for a decrease is the more frequent thinning out of decaying wood, and, generally, a higher system of Forestry. This may have had some operation also in the Inverness Forests, but if so I do not regard it as the sole cause, though it may perhaps have completed or hastened the decrease. Sir Dudley Marjoribanks, whom I have already quoted, makes mention of an extraordinary increase of Starlings, Jackdaws, and Sparrows, which species prior to 1851 were unknown at Guisachan. As nearly as can now be ascertained, 1851 was also about the date when Woodpeckers began to decrease in numbers. Mr. F. Norgate, in his interesting article on the "Nesting of the Nuthatch in Norfolk,"* has pointed out what a very large percentage of the nest-holes of both *Picus viridis* and *Picus major* are occupied by Starlings, soon after they are made, observing that nearly ninety per cent. of the nesting-holes of the Great Spotted Woodpecker are thus taken possession of. I have for some time been collecting materials for an exhaustive account of the Greater Spotted Woodpecker in Scotland, but on reading Mr. Norgate's article it occurred to me to forward these few notes for comparison with his, reserving for a future occasion a more exhaustive account of the species, should such be considered desirable.

In conclusion, if many of the ancient birch and other trees occupied by the Woodpeckers have perished from age, thus restricting their breeding-haunts, and if a large number of those still standing are occupied by Starlings and Jackdaws, perhaps even by Sparrows, a case may actually be made out against the survival of the Woodpecker from direct causes.

I am still collecting information on this subject, and shall be glad of further particulars from observers in any part of Scotland heretofore inhabited by Woodpeckers.

* *Vide antea*, p. 41.

THE SKUA GULLS AND THEIR RECENT MIGRATION.

BY HOWARD SAUNDERS, F.L.S., F.Z.S.*

THE attention of ornithologists has lately been drawn to an unusually abundant autumnal migration of several species of Skuas, and numerous captures have from time to time been recorded in these pages and in 'The Field.' Inquiries have also been made, and discussion excited, respecting the different plumages of the various species; and, in a recent number of 'The Field,' an appeal has been made to some specialist who has handled more than an average number of specimens to pronounce on the distinguishing characteristics of the Pomatorhine and the Richardson's Skuas. It is easier to do this than to point out distinctions which no one can possibly mistake in any stage between the Richardson's Skua and Buffon's Skua; but, as I have long made the Gulls and Terns my special study, I may perhaps be able to give some hints upon these and other points. It should, however, be remembered that I by no means imagine that I know all about the subject, and it is mainly in the hope of receiving information from those whose opportunities for observation have been superior to my own that this sketch is written.

The most interesting point about the recent migration of the Pomatorhine Skuas was the statement made by Mr. T. A. Nelson, of Redcar, that he obtained amongst others "two birds entirely black, the tail-feathers about three inches long, legs black, and bills exactly similar to the old birds." This melanism was well known as occurring freely in the case of Richardson's Skua, and might therefore be expected in its congener; but I had never had the good fortune to examine a black Pomatorhine until within the last few days, when I inspected one in Mr. E. Booth's magnificent collection of British birds at Brighton. In this fine specimen the central tail-feathers are about as well developed as in any other adult, the feet and legs are both black, and the plumage is of a deep sooty colour—as complete a melanism, and as fine an adult, as one could hope to see. With regard to Mr. M. Browne's inquiry as to the invariable distinctions between this species and Richardson's Skua, my friend Mr. R. Warren

* Reprinted from 'The Field,' of January 17th, 1880.

has already supplied him with particulars; but it may not be a vain repetition to point out here the distinguishing characteristics in the immature examples of both species, which alone can present any possible difficulty. The general dimensions of the Pomatorhine are considerably larger than in Richardson's Skua. In the smallest immature Pomatorhine the wing (measured underneath, and therefore short measurement) is 13·7 in. from carpal joint to tip, and the tarsus 2·5 in.; whilst in Richardson's these parts are respectively 12 in. to 12·5 in. and 1·7 in.; also in the former there is much more white on the inner webs of the primaries, and the central rectrices, besides projecting but little, have their points of a rounded shape, very different from the pointed form assumed by those feathers in a Richardson's Skua of even a few months old. The young of the Pomatorhine are usually of a sooty brown, more or less mottled with white on the under parts with advancing age, until in very old birds the dark pectoral band entirely disappears, and the whole breast and abdomen down to the vent (which is dark) becomes white. Specimens in such fully adult plumage are, however, rare; and in one, obtained in the Faroes in May, 1877, the central rectrices are of the unusual length of 3·7 in., their rounded and half-twisted shape being wholly different from those in any other species.

In its migrations, so far as are recorded, the Pomatorhine seems to have been more frequently noticed along the east side of Britain, after which it suddenly turns up in tolerable abundance on our S.W. coast, especially at Torbay; but from these scattered facts few deductions of any value can be drawn, for observers are few and far between, and it is but rarely that these birds come sufficiently close to land to afford opportunities for observations. As Mr. Booth pertinently remarks, there is probably nothing unusual in the present migration beyond the fact that, owing to the winds and weather prevalent at the time, the birds have come closer to the coast, and have consequently been more remarked. If the fishermen all round our islands were practical ornithologists, and in the habit of recording their observations, we should in a few years be wonderfully enlightened, not only with regard to the migrations, but as to the frequent occurrence some thirty or forty miles from shore, of species which are often described as "very rare and accidental visitors."

The men who have been out all night fishing, or those who have the watch on board ship at the time that movement begins in the bird world, are those who have the best chances for observation; but—I speak from a sad sense of my own deficiencies—though the spirit is willing, the flesh is weak, and even the ornithologist has at such a time been found sheltered from the blast, and trying to coax a pipe of damp Cavendish, regardless of the winged forms which were animating the dawn-lit air and waters. Of course it is hopeless to expect our fishermen to record migrations, when even our sailors and our amateurs do not do half what they might; but, until we try to avail ourselves of the stores of information these men could give if they were asked, we shall never know much of migrations of sea-birds. There is, however, some hope from the reports which are now being carefully prepared by Mr. John Cordeaux, Mr. J. A. Harvie Brown, and others, from notes kept by those employed on the lightships and lighthouses off our coasts; but, after all, it is on the fishing grounds that sea birds of all kinds most do congregate.

Of the life-history of the Pomatorhine Skua less is known than of any other member of the family. It was found as far north as Parry went in his famous boat voyage, *viz.*, 82° N. lat., and it ranges in summer throughout the greater part of the Arctic regions, being known to breed on the Taimyr “barrens,” and on the Boganida in Siberia, where Middendorf obtained its eggs; and it is also believed to breed to the northwards of Egedesminde in Greenland. There are probably many other breeding-places still undiscovered, but actual proof is still wanting, and authenticated eggs are to be found in very few collections. In autumn it goes southward, and isolated specimens enable us to trace its course down the West Coast of Africa, and, touching at Moulmein, as far as Cape York in North Australia; whilst on the American side it has been obtained as far south as Pennsylvania on the east side, and Alaska and the Pribilof Islands on the west. The ‘Challenger’ also obtained a fine adult in Japan. It may, and probably does, visit other coasts; but that is all we know of its range, information being, as usual, most meagre respecting the North Pacific district.

Richardson’s Skua, *Stercorarius crepidatus*, is a better known species, and also one which is far more puzzling in its varying

plumages. I went up to Shetland last July, with the object of studying the young in down and in their first plumage, and arrived at some tolerably clear conclusions; but there are still several points which could not be cleared up by one investigator, nor in a single season. It may confidently be stated that there are two extreme varieties in the adults—the one having the breast and under parts of the same dusky hue as the back; and the other in which the under parts are white. These two varieties breed together, and pairs are found consisting of two white-breasted birds, or of one white and one dark bird, or of two dark birds. Where light forms are mated, the young are perfectly recognisable, and the same is the case with the offspring of two wholly dark birds; the young of a light and a dark form are also distinguishable; but the question to be solved is, What are the offspring of these “mixed marriages” on attaining maturity? Each pair has two young, but it is not altogether easy to find out whether one of these resembles one parent and one resembles the other, because these young, from the downy stage upwards, leave the shallow “nest,” if it may be called so, and are to be found squatting about on the moors so far apart as to preclude any positive identification. The question can only be solved by selection of the young of such a pair, and by keeping them in captivity for several years; and it is to be feared that this experiment will not be carried out for some time to come. I do not think that the dark plumage is a sign of immaturity, or that birds which breed in this plumage will ever become light-breasted, for the dark breeding birds have the acuminate feathers on the nape of quite as burnished a yellow colour as the light forms, and that is a sure sign of age in all the Skuas; but whether the half-bred birds which are found breeding with partially white breasts ever lose their gorget and become entirely white, is still unknown to me.

There are few more interesting sights than a breeding-place of Richardson's Skua. As the visitor traverses the wild moorland, furrowed by the rain with innumerable channels, sharp-winged angular forms rise against the sky, and are seen skimming the heather with a flight which has been described as “hawk-like,” but which differs in its peculiar “balancing,” as distinct from “hovering,” from that of any other bird. As the intruder advances, a loud “mee-ah” is heard, and this may be followed by

a vicious "swish" past the ear, not always unaccompanied by an actual blow from the wing. My hat was struck three times by one bird, but always from behind; and when I followed it, however furtively, with my eye, it always flinched from the swoop. There is great difference in the boldness of individuals, and but few swooped very close. Those that did so were always dark birds; but that might arise from predominance of that colour in the colony. This attack is apparently to divert the attention, and shows you are getting "warm;" but as soon as the young are discovered, and even whilst they are being handled, the menacing "mee-ah" changes into a plaintive "ee;" and no further attack is made upon the spoiler, although the indignant parents often relieve their feelings by dashing at others of their own species, or any bird in their vicinity. I once saw an unfortunate pair of Whimbrels, which were in a great state of alarm about their own young, most viciously attacked by a couple of offended Skuas. There is much difference in the individual characters of the young; for, though all squat perfectly still until they are handled, some will then fight viciously with their feet, and make free use of their claws, whilst others will even follow up and worry an extended finger with the bill. This is quite irrespective of age, some little fellows in half-down being more savage than others of double their size.

In the autumn the migrations of this species are pushed even farther southwards than that of the preceding, for it appears to pass our winter off the Cape of Good Hope, and also on the Mekran coast and the Persian Gulf, and has even been obtained in New Zealand. I think, from descriptions, that it visits Rio de Janeiro; but the record is very deficient with regard to South America, and information on the subject is much to be desired from both the east and the west coasts. In North America it is tolerably abundant along the Atlantic seaboard, and reaches through the Arctic Regions to the Pacific side, from whence we have little information respecting it. All the specimens brought home from the far north are white-breasted, which looks as if the dark was comparatively a more southern form. It was to this latter that the name of Richardson's Skua was originally applied, under the erroneous impression that it was a distinct species; but I employ it because it is generally known, and is the only one which cannot produce any confusion—other

terms, such as "Arctic Skua," &c., having been applied to several species.

Several examples have also been recorded of the capture of the Long-tailed or Buffon's Skua, the species to which Linnæus gave the name of *Larus parasiticus*; and as *Stercorarius parasiticus* it ought be known, although unfortunately that name has sometimes been erroneously applied to the preceding species. Linnæus gave an unusually precise and accurate description, calling the central tail-feathers "longissimis," and stating that the *shafts* of the *two outer primaries* are *white*—the inference being that the shafts of the other primaries are *not* white. Now, this is just the feature which serves to distinguish the two species in *all* ages, whilst there are other points which prevent any mistake in the adults. It is true that the young of Buffon's Skua is rather smaller, and, so far as one can judge from the few specimens available, it is of an uniformly smoky colour, mottled with greyish, but without any of that *brown* shade so frequent in Richardson's; the central tail-feathers also project more than in Richardson's of the same age. These distinctions are, however, not always so strongly marked as could be wished; but a reference to the *primaries* will decide the question. In the Buffon's Skua the shafts of the two outer primaries are *white*, those of the remaining primaries being dusky; whilst in Richardson's Skua the shafts of *all* the primaries are *white* throughout the greater part of their extent; and even in young birds it is only towards the tips that the shafts are of a shade at all approaching that of the webs. In the young of all three species the feet are variegated, being of a livid or clay colour posteriorly, and blackish towards the nails, becoming black at maturity; so that these marks are no specific distinction. In the adult Buffon's Skua the central rectrices project about eight inches beyond the others, whilst in Richardson's they seldom exceed the lateral feathers by more than three inches.

Buffon's Skua occurs throughout the whole of the Arctic Region, and has been found breeding on the fells of Lapland, on Novaya Zemlya, and in portions of Siberia; but its autumnal and winter range is somewhat difficult to trace with precision, owing to the confusion which exists with regard to this and the preceding species. I do not at present feel any certainty respecting the correctness of its identification beyond the Straits of Gibraltar,

but it probably goes farther south in pursuit of the Terns, which its dashing rapid flight enables it to rob with ease. In this, as in many other cases, "What is hit is history: what is missed is mystery."

There remains but one other British species, the Great Skua, *Stercorarius catarrhactes*, a few examples of which have also been obtained this autumn. It is nowhere numerically abundant, and in the Faroe Islands, once its stronghold, it is rapidly decreasing, being classed amongst the injurious birds for whose destruction a reward or "neb-toll" is paid. In Shetland, where I visited one of its breeding-places, it is most carefully preserved, otherwise it would long since have become extinct there, for the bird knows no fear, and attacks the intruder as soon as its territory is invaded. First comes a swoop close to the head, another, and another, till the young are actually discovered, and then one or both of the old birds charge boldly, even when you face them. It is no sly attack from behind, as with the "Allan" (Richardson's Skua), but as you front the bird it comes down as straight as an arrow, sweeping the heather as if it were going to strike the very centre of your body. At about twenty yards' distance down go the talon-armed feet, their webs spread to the full extension, and the eyes seem to stand out from the sides of the head, as the enraged bird swirls past, just clearing the top of your head, and making the whole atmosphere vibrate with the rush of its pinions. Round it swoops, and meanwhile perhaps the other one comes down in a like manner; and so the game is kept up till you are tired, for the birds do not seem to weary so long as their domain is molested. As it is no joke to be hit on the head by such a large bird, and as it might at the same time hurt itself (an accident to be regretted, as Great Skuas are far rarer than ornithologists), it is advisable to hold a stick a little above the head, as the birds will always clear it. In this, as in all the other species, two is the usual number of eggs in each nest; but last year, owing perhaps to the weather, I fancy that many pairs only reared a single young one. Beyond the Shetlands and the Faroes, the Skua breeds in a few places in Iceland, and is also found apparently, in small numbers, throughout British North America and across to California, where, however, only one specimen is on record as having been obtained. This sudden break-off in its distribution is somewhat remarkable, inasmuch

as on the South Pacific Coast, from Peru to the Straits of Magellan, there is another species (*Stercorarius chilensis*), which is more closely allied to *S. catarrhactes* than to *S. antarcticus*, a third species of Great Skua, which also inhabits the southern hemisphere, ranging from New Zealand, throughout the Antarctic Regions and by way of Kerguelen, the Crozets, &c., to the Falkland Islands and the east coast of Patagonia. On its migration the northern Great Skua occurs on both sides of the Atlantic, but it has not been traced farther south than the Straits of Gibraltar, and information is much desired. It is rather an easy species to recognise even on the wing, both from its habit of pursuing and plundering the Gulls and Gannets, as well as from its bold sweeping flight, in which the white mirror on the primaries is a very marked feature; so that some of our naval officers who take an interest in the birds they come across at sea may perhaps be able to supply details respecting it.

In this sketch of the Skuas I have endeavoured, whilst avoiding technical descriptions and details, to give those particulars which appeared most likely to awaken interest and to stimulate research. How much still remains to be learned upon the geographical distribution of this sub-family will be only too manifest to all who have read these remarks.

ON THE AIR-BLADDERS OF FISH.*

By FRANCIS DAY, F.L.S., F.Z.S.

AMONG the organs existing in fish, few have given rise to more speculation and discussion than the air- or swim-bladder, also termed air-sac or air-vessel, which is a single or variously subdivided sac, or it may be two sacs partially or completely separated one from the other. Situated above the centre of gravity, it is beneath the vertebral column or back-bone, from which it is generally more or less divided by the kidneys: while inferiorly it is separated from the intestines by the peritoneum. As this air-bladder may be present or absent in species belonging to the same genus, and is frequently wanting, it is evident that it cannot be indispensable to a fish's existence, that its functions

* Summary of a Paper read before the Cotteswold Naturalists' Field Club, 17th February, 1880.

must be accessory or supplementary to those of other organs under certain circumstances.

If we investigate the origin of this organ in the animal's embryonic state, we find that it originates as an offshoot or bud from the stomach or upper portion of the alimentary canal; that this offshoot elongates, then enlarges at its terminal extremity into what will subsequently be the air-bladder; consequently at some period of the fish's existence there is an open tube connecting the air-bladder with the alimentary canal, into which it opens, usually on its dorsal, rarely on its lateral, and occasionally on its inferior or ventral surface.

In the Dipnoids or highest class of Fishes the air-bladder has stiff walls, is distinctly or indistinctly double, lung-like, and communicates throughout life by means of a duct and glottis with the œsophagus. The duct in *Lepidosiren* and *Protopterus* opens on the ventral or inferior surface of the alimentary canal, as it does in Batrachians and the higher vertebrates. In *Ceratodus* the opening is on the left side, near, but not on, the ventral wall of the pharynx. The duct in the forms enumerated would evidently be homologous to the trachea or wind-pipe, while the functions of the air-bladder are likewise analogous to those of lungs, as these fishes employ them under certain conditions for respiratory purposes, taking in atmospheric air direct.

The Ganoids afford instances very similar to what obtains among the Dipnoids: thus the air-bladder in *Amia* has a lung-like function; its pneumatic tube is short and protected by a glottis, but the position where it opens into the alimentary canal is dorsal and not ventral, as in the Dipnoids and higher classes. *Polypterus*, however, has its opening on the ventral surface of the pharynx: while in *Acipenser* this organ has no lung-like function, it is used merely for hydrostatic purposes, and the opening is that of a lower type, being on the dorsal aspect of the pharynx, and destitute of any valve. The forms adverted to, however, connect the simple air-bladder of the *Acipenser*, or Sturgeon, with the lung-like air-sacs of the Ganoids, and thus with the Batrachians and higher vertebrates.

But these organs are not considered lungs in most fishes by many anatomists, for the reason that the air-bladder is supplied with blood from the adjacent arteries of the body, not direct from the heart, and returns venous blood into the general circulation.

In *Ceratodus*, however, although there is no special vessel employed to convey blood to the air-bladder, still we see this organ taking on a higher character than observed in *Acipenser*, for instance, as the blood returned is purified and carried direct to the heart, which arrangement does not, however, exist in *Amia* and *Lepidosteus*, both of which fishes evidently use their air-bladders for respiratory purposes.

Lepidosiren is doubtless the highest known form of living fish, forming a transitional link between Amphibia and Fishes; to its air-bladder venous blood is distributed and arterial taken away direct to the ventricle. Consequently we find that in this fish, owing to the non-development of gills on the two inferior branchial arches, the blood is not arterialised there, but passes on to the air-bladder for this purpose; for the blood which is carried there is from the returning dorsal portion of the branchial vascular arches prior to their union to form the aorta. In fact, venous blood is distributed to and arterial carried away from this organ direct to the ventricle of the heart. In *Polypterus* we observe the same distribution of vessels, but due to the gills being present on the lower branchial arches, the blood is oxygenated there, and consequently when taken to the air-bladder is not venous, as in *Lepidosiren*, but arterial.

That the air-bladder is homologous with the lungs* of Batrachians and air-breathing vertebrates appear to be proved, as transitional links in the position and functions of this organ can be traced from the *Lepidosiren* and *Ceratodus* (wherein it is distinctly lung-like, and opening on or near the ventral surface of the pharynx) to the *Polypterus* and *Acipenser* down to the Teleostean fishes.

In the bony or Teleostean fishes, we find the air-bladder in adults in two distinct forms. I have already observed that in the embryo it originates as a tube or offshoot from the alimentary canal. This tube may become entirely obliterated, when such forms are termed *Physoclisti*; or else the canal may continue pervious throughout life in the form of a pneumatic tube or safety-valve, connecting the air-bladder with some portion of the stomach or upper part of the alimentary canal, in which case they are termed *Physostomi*. This pneumatic tube may or may not

* "The air-sac is supplied with branches from the pneumogastric nerve, like the lungs of higher vertebrata." Grant, 'Comparative Anatomy,' p. 546.

be furnished with a distinct valve precluding the inlet or exit of atmospheric air.

In short, among the Teleosteans the air-bladder exists as a closed sac of diverse forms, *Physoclisti*, in the spiny-rayed *Acanthopterygians*, the spineless *Anacanthini*, the tufted-gilled *Lophobranchii*, and the hard-jawed *Plectognathi*; whilst in the remaining orders, the pneumatic duct remains patent, as in the whole of the *Physostomi*, excluding the Family *Scombresocidæ*.

In such forms as swim near the surface this organ is mostly of a comparatively small size, while in those which live near the bottom, as the flat-fishes, *Pleuronectidæ*, it is, as a rule, absent. When this organ is ruptured the fish mostly sinks, turning on its back and remaining at the bottom: on the other hand, some forms which have been hooked or netted at great depths and suddenly brought to the surface without having time to compress or partially empty their air-bladder, the contained gas, being no longer weighed down by superincumbent water, rapidly expands, causing the organ to burst, or else forcing the stomach and upper portion of the alimentary canal into the fish's mouth.

The air-bladder is generally found after death tightly distended with gas, which consists mostly of nitrogen in fresh-water forms, and oxygen in marine genera. It has formed a subject of discussion as to how this gas is generated, but as in those classes in which this organ is a closed sac (*Physoclisti*), it is perceived as well as in others possessing a pervious pneumatic duct (*Physostomi*), one cannot resist believing that the gas may be eliminated in most instances from the blood-vessels lining its interior. Probably the gland which is so apparent in most of the *Physoclisti* serves for the purpose of removing superfluous gas or any deleterious substances, acting in fact as a depurating organ.

The chief uses of this organ in Teleostean fishes appear to be two. (1) Hydrostatic, or for flotation, serving the mechanical purpose of enabling its possessor to maintain a desired level in the water, and which is usually accompanied with the power of removing, expelling, compressing, or dilating its gaseous contents, so that it can rise or fall as necessity occurs. (2) The second use is acoustic, it being partially or entirely employed for hearing by means of various modes of connection with the internal ear.

Among the *Physoclisti*, the majority of which are marine forms, we find this organ as a closed sac, the greatest length of

which is usually in its longitudinal axis. In some forms, as in *Holocentrum* and *Sargus*, cœcal processes pass inwards to attach themselves to a membrane closing in a portion of the internal ear. The varieties of air-bladders in the *Physoclisti* are exceedingly numerous, but it is not my purpose to refer to such in this place.

Among the *Physostomi*, or those families of fish in which a pneumatic tube continues pervious throughout life, we find the majority are fresh-water forms, placed intermediate between the *Physoclisti* and the Ganoids. This pneumatic tube possesses the same coats as the air-bladder, an external, fibrous and tough, and an internal, which is mucous and vascular: its length is various, while it is said to be occasionally tortuous. It opens, as a rule, on the dorsal wall of the alimentary canal, or, as in the Herring and its allies, at the terminal extremity of the stomach. But one form among the *Characinidæ*, the *Erythrinus*, is a most interesting link between *Physostomus* Teleosteans and air-breathing Ganoids: in this genus, although the air-bladder is above the alimentary canal, the pneumatic tube passing downwards pierces the left side of the throat. The air-bladder is likewise divided by fibrous partitions, but whether such are exceedingly vascular or not, whether this fish uses this organ for respiration or simply for flotation, there does not appear to be any information on which to decide.

It seems to be the rule, so far as I have yet been able to ascertain, that the fresh-water *Physostomi* have a connection by means of a chain of ossicles between the air-bladder on one side and a process of the internal ear on the other. Instead of a tube filled with gas passing inwards from the air-bladder, as in some *Physoclisti*, to the base of the skull, the connection is entirely of an osseous character. In the *Cyprinidæ* it is more or less as follows:—Three ossicles on either side connect the outer surface of the air-bladder with the atria of the labyrinth, consequently any dilatation or compression of the contained gas must have some effect upon the movement of this chain of bones. These auditory ossicles were first pointed out by Weber, and since his time it has been shown that they pertain, like the capsules of the special organs of sense, to the splanchno-skeleton.

In the same family of Carps we find, in the East Indies, a curiously modified form of Loach, *Botia*. In its habits it can

scarcely be said to be a ground-feeder, but appears to be intermediate between the true Carps and the grovelling Loaches. The anterior portion of its air-bladder, or what may be termed its acoustic part, is more or less enclosed in a bony capsule, formed by the parapophyses of some of the anterior cervical vertebræ. Among the true ground-feeding classes, as *Nemacheilus* and *Cobitis*, it almost appears as if the posterior two-thirds of the air-bladder, or that used for hydrostatic purposes, were deficient, this organ being in the form of two rounded lobes placed side by side, below the bodies of some of the anterior cervical vertebræ and where they are enclosed in bone, as observed existed in the anterior part of the air-bladder in the genus *Botia*. It is very remarkable that in the elevated regions of Western Turkestan the air-bladder of the Loach, *Nemacheilus*, has become modified, for there it exists as seen in *Botia*, for which reason Kessler has formed a new genus, *Diplophysa*, for their reception.

Another fresh-water family of *Physostomi*, the *Characinidæ*, residents of Tropical Africa and America, are exceedingly interesting as regards how this organ is modified in respect to hearing, a chain of auditory ossicles extending from it to the internal ear, as existing in *Cyprinidæ*; while, as already observed, one genus, *Erythrinus*, seems to connect the *Physostomi* with the Ganoids. The extensive fresh-water Physostomatous family of *Siluridæ*, or sheat-fishes, has likewise some marine representations, and is more especially found in tropical countries. Among them the air-bladder is remarkably modified, in the majority of instances being apparently more useful for auditory than hydrostatic functions, and as a general rule smaller in fresh-water than in marine species. These fishes are evidently closely allied to the *Cyprinidæ*, and in one respect the air-bladder shows a somewhat similar modification in the two families. I have observed how, in the grovelling Loach and some allied forms, it is more or less enclosed in a bony capsule, and this is seen both in European and Asiatic forms, all of which, however, may be said to be ground-feeders. The Siluroids in India likewise live the life of ground-feeders, and the power of employing the air-vessel as a float appears to be subservient to that of hearing. In the marine forms it has thickened walls, and is attached to the bodies and processes of some of the anterior vertebræ. As we pass inland, however, or towards mountainous regions, this organ becomes more

or less enveloped in bone, as observed upon in the Loaches, and, like the *Cyprinidæ*, a chain of ossicles passes forwards to the internal ear. Finding that the majority of these fishes with bone investing their air-vessel were found near the mountains, at once led me to conjecture that such must have something to do with sound. The number of genera existing in India and Burma in fresh water is twenty-five, out of which fourteen have the air-bladder more or less enclosed in bone, and, as all are ground-feeders, it appears probable that one reason at least is to prevent undue pressure on the organ when at great depths.

The chain of auditory ossicles connecting the air-bladder with the internal ear, as far as I know,* is confined to the fresh-water *Cyprinidæ*, *Characinidæ*, and *Siluridæ*, all of which are Physostomous; while that having the lowest organization, its opercular pieces being incomplete, is the *Siluridæ*, and which alone appears to have marine representatives. Whether further investigation will confirm this, time alone must show, but if such should prove to be the rule, it would seem that this forms a connecting-link between such as are marine with those which belong exclusively to the fresh waters.

Among the marine Physostomous forms, all that have been examined, I believe, and in which communications between this organ and internal ear exist, have such by means of cœcal prolongations from the air-bladder and not by a chain of auditory ossicles, which appear to be wanting in marine fishes. This leads one to enquire whether there are any fresh-water fishes that have the connection between these organs, as seen in sea-fish. The Perch has no auditory ossicles, and I should consider it of marine origin; and the same conclusion may be arrived at regarding Trout and the anadromous Salmon.

In conclusion I think it may be affirmed that the air-bladder in fishes is the homologue of the lung of the superior vertebrate forms; that in some of the higher sub-classes it serves as an accessory respiratory organ depurating the blood; that in the majority of Teleostean fishes it is employed for one or both of the following purposes:—as a float, enabling its owner, by compressing or dilating it, to sink or rise to any required level in the water; while, secondly, it assists hearing by communicating

* Most probably this chain of ossicles will be found in some other fresh-water families, but which I have not yet had the opportunity of investigating.

with the internal ear; that in those forms in which it has an auditory function we perceive two very distinct modifications: (1) in the marine *Physoclisti* or *Physostomi* a tubular prolongation of the air-bladder itself passes forwards to the interior of the skull, while in fresh-water *Physostomi* the connection is by means of a chain of auditory ossicles: that in such fishes as live the life of ground-feeders a still further modification of the air-bladder may occur, by its being more or less completely surrounded by osseous walls owing to a development of some of the parapophyses of the anterior vertebrae.

OCCASIONAL NOTES.

WHITE STOATS.—Seeing some remarks in reference to the rarity of white Stoats in 'The Zoologist' (p. 55), by Mr. G. B. Corbin, I beg to state that my keeper brought me the skin of a Stoat which he had caught in a trap on January 29th, which was completely white, with the exception of a very narrow dark brown line on the back of the neck, about a quarter of an inch long, and the characteristic black tip to the tail. As I did not see the animal before it was skinned, I am unable to say whether it had pink eyes or not.—E. J. GURDOW (Hopton, Thetford).

REPORTED DISCOVERY OF THE EGGS OF THE CURLEW SANDPIPER.—At p. 425 of the last volume of 'The Zoologist' attention was directed to Dr. Brewer's announcement of the discovery in North Greenland by an American naturalist of the eggs of the Curlew Sandpiper, *Tringa subarquata*, hitherto unrepresented by authentic specimens in any collection. In the last number of 'The Ibis' (1879, p. 486), Capt. Feilden has criticised this report, and stated his reasons for believing that the discoverer has unintentionally fallen into some error. His remarks are so much to the point, and the subject is one of such interest to ornithologists, that no apology seems needed for giving wider publicity to his letter. Capt. Feilden says:—"At page 375 of 'The Ibis' for 1879, Dr. T. M. Brewer, of Boston, U.S., records that *Tringa subarquata* has been discovered breeding in the district of Christianshaab, in the Inspectorate of North Greenland. If the circumstances of the case, as detailed by Dr. Brewer, bear investigation, and it is a fact that the Curlew Sandpiper has been found nesting in North Greenland, it is a very astonishing addition to the Ornithology of that region. I trust that I may not be deemed hypercritical or ungenerous in suggesting that, if the alleged nesting of

the Curlew Sandpiper in North Greenland rests on no stronger evidence than that recorded by Dr. Brewer in 'The Ibis,' it must at any rate be received with caution. The Ornithology of the west coast of Greenland, as far north as the district of Upernivik, or, in other words, to nearly the seventy-fourth parallel of north latitude, has received careful investigation by a number of Danish naturalists, both resident and non-resident in Greenland, embracing such well-known names as Fabricius, Holbøll, and the Reinhardts. The Curlew Sandpiper has not been recorded by those observers and naturalists as even an uncommon visitor to the coasts of Greenland; and now to be told that it is not uncommon as a breeding species in the district of Christianshaab may well excite incredulity. Moreover, it may be remarked that the species has never been recognised in Iceland, the Færoe Islands, or on the coast of East Greenland, and is recorded as scarcely more than a straggler along the Atlantic coast of the United States. The breeding haunts of *Tringa subarquata* appear to be the tundras of North-Western Europe and Northern Asia; and I should as soon expect to hear of the nesting of *Tringa Temminckii* or *Tringa minuta* in Greenland as of the Curlew Sandpiper. In thus expressing myself, I do not wish to cast any reflection on Mr. Ludwig Kumlien, who may be a competent observer; for by Dr. Brewer's account the eggs now in the Smithsonian Institution, and credited to the Curlew Sandpiper, were not found by Mr. Kumlein, but were procured through the assistance of my friend Mr. Fencker, one of the Danish officials at Godhavn, Island of Disco. I expect that, on inquiry, it will be found that these eggs were not collected by, nor under the personal supervision of, Mr. Fencker, but obtained by him from native Greenlanders during his official visits to the settlements on the mainland opposite Disco Island. I regret that I am unable to give a precise account of the proceedings of the expedition to which Mr. Ludwig Kumlein was attached as naturalist; but the following brief sketch will, I think, be found substantially correct. On the return of the British Polar Expedition in 1876, it was urged by Captain Howgate, of the United States Army, that an attempt to reach the North Pole should be inaugurated by planting small colonies along the shores of Smith Sound, which would form the basis for further operations. Some money was collected for this purpose, but on a scale quite inadequate for a scheme of such proportions; however, a small sailing-vessel was fitted out as a tentative measure, and despatched to Davis Strait in 1877, under the command of Captain G. E. Tyson. I do not suppose that a voyage to the Polar Regions was ever seriously entertained by this expedition, which was totally unfit for such an attempt; at any rate the vessel wintered no further north than Cumberland Sound, which is situated on the west side of Davis Strait, a little south of the Arctic circle, and where American vessels engaged in whaling not unfrequently winter. In the summer of 1878

Captain Tyson crossed Davis Strait in his vessel, called in at Godhavn, and afterwards returned to the United States. I think it highly probable that the supposed Curlew Sandpiper's eggs were obtained by Mr. Kumlein from Mr. Fencker during this visit to Godhavn, and that Mr. Kumlein did not personally find *Tringa subarquata* nesting in the district of Christianshaab, North Greenland." Under these circumstances, therefore, we must await further evidence, before giving implicit credence to the report that the eggs of the Curlew Sandpiper have really been discovered.—J. E. HARTING.

EARLY ASSUMPTION OF SUMMER PLUMAGE IN THE BLAËK-HEADED GULL. — A specimen of this elegant Gull, caught inland during the second week of January, was beginning to assume the summer dark hood. The disk of the "mask" was very distinctly marked, and the border did not extend beyond the face behind the eyes,—not reaching the neck,—resembling the representations of the so-called "Masked Gull," which, by-the-bye, is neither figured nor referred to by Mr. Gould, in his 'Birds of Great Britain.' The upper part of the breast, the whole of the tail and tail-coverts of this specimen are pure white, but the lower part of the breast and belly are light buff-yellow—probably this was rose-colour when the bird was alive; the bill and feet bright coral-red. I have sent this notice more especially to call attention to the unusual early change of plumage in this specimen, which appears to be quite adult, both from the absence of any black at the end of the tail, and from the unsullied character of the delicate French grey of the dorsal plumage.—EDWARD HEARLE RODD (Penzance, January 19th).

[With unfeigned regret we mark this communication as the last we shall ever receive from our late friend and correspondent, Edward Hearle Rodd, by whose death we have lost one of the oldest and most valued contributors to the pages of this Journal. See page 113.—ED.]

IMMIGRATION OF LONG-EARED OWLS IN WILTSHIRE.—In reference to Mr. Gatcombe's account, in the number of 'The Zoologist' for February (p. 49), of the strange irruption of Long-eared Owls in Devonshire, and his surprise that nothing has been said of their appearance in like manner in other places, I beg to state that I received information not long since from the south of this county, that two gentlemen while shooting in Groveley Wood, not far from Salisbury, about the middle of November last, came upon a flight of Long-eared Owls, whose numbers they estimated at about twenty, and which seemed to fly out of every tree. The same sportsmen were again in Groveley Wood in the following week on November 29th, and four Long-eared Owls flew out of one tree. The frost was very severe at the time. As this was the first occasion on which I had heard of such a flight of Long-eared Owls, I ventured very delicately to enquire whether there might by possibility be any mistake as to the species, and whether

they might not have been Short-eared Owls, which notoriously do sometimes appear in packs; but my informant, who is an excellent ornithologist, assured me that there was no room for doubt as to the species, the sportsmen in question being both practical field naturalists, and their information perfectly reliable. This statement completely satisfied me; and now Mr. Gatcombe's account of a similar flight in Devonshire corroborates the statement, and shows that the arrival of a considerable body of Long-eared Owls is not peculiar to either county.—ALFRED CHARLES SMITH (Yatesbury Rectory, Calne). [Mr. W. Oxenden Hammond, of St. Alban's Court, near Wingham, Kent, has favoured us with a note of a similar occurrence on his own property last autumn.—ED.]

WAGTAILS GREGARIOUS AT ROOSTING TIME (Zoologist, 1878, p. 390).—There is a large reed-bed in the river here, almost close to the highway. where in the autumn—and notably during the month of October last—hundreds of small birds of the Swallow and Wagtail class chatter and roost; in fact, just before dark they flock in from all quarters, and it seems almost incredible that so many inhabit the neighbourhood, and yet are so seldom seen at any other but roosting time. Sometimes of an evening I have seen such numbers of Wagtails—not all the same species—flitting and chirping over this much-loved resort, that the very reeds seemed alive with them, and yet in a great measure each species had its own particular mode of procedure. One evening, especially, I noticed a number of Pied Wagtails settle upon a fence in a field adjoining the river; and, what is remarkable, each bird was perched about a yard from its fellow, watching the insects which danced over the stream before them, and occasionally darting out and catching one of them, but as often returning to the fence. Whilst thus engaged numbers of the other species—Grey Wagtails possibly—were restlessly flying about over the reeds, settling here and there, keeping up an incessant chirping, and looking at a distance almost like some light-coloured moths flitting and dancing up and down above the reeds, for the white feathers of the tail were very conspicuous.—G. B. CORBIN (Ringwood, Hants).

WILDFOWL AT LARNE, CO. ANTRIM.—During the month of December last the Wildfowl were so starved with hunger that, instead of remaining in their usual haunts, they resorted to the sea-beach for food. Golden Plover, Snipe, and even Woodcock were plentifully shot there. Large flocks of Wild Geese and Swans passed over Glenarm much exhausted. One Swan dropped from the flock in Glenarm Park, and was shot next day; it proved to be a young Bewick's Swan. Gulls of various species were very common along the shore. Amongst them I observed four Iceland Gulls; one of these was shot in December in immature plumage. The spring of last year was so wet and cold that a great number of eggs were destroyed,

and, even where the brood came out, the young birds in many cases died. Hence a marked diminution of our resident birds has taken place; but very few Swifts, Swallows, and Martins made their appearance during April and May, and many of their breeding quarters were quite forsaken.—THOMAS BRUNTON (Glenarm Castle, Larne).

OCCURRENCE OF THE ALPINE SWIFT IN DEVONSHIRE.—When out shooting along the coast with my brother, on the 4th October, 1876, he shot a young specimen of the Alpine Swift (*Cypselus melba*, Illiger), which was flying with two others in company with *C. apus*, of which there were about a score. We thought they would lodge on the cliff for the night, but nothing was to be seen of them next morning. Unfortunately the other two never came within gunshot. I have the skin in my possession.—H. E. RAWSON (The Vicarage, Bramley Common).

[The occurrence in the British Islands of this fine Swift—which is found in Central and Southern Europe, Western Asia, and Africa—has been recorded some score of times, during the months of March, May, June, July, August, September, and October. The 4th October is a late date at which to find the Common Swift still here, but is not unprecedented. An Alpine Swift procured in Norfolk was shot on the 13th October, 1831, and another was obtained at Hulme, near Manchester, on the 18th October, 1863. Yarrell, in the Preface to the first edition of his 'British Birds,' refers to one killed at Oakingham on the 8th October, 1841.—ED.]

OCCURRENCE OF THE HEN HARRIER IN LONDON.—A male specimen of this bird was picked up, dead, in the grounds adjoining Hereford House, Brompton, on the 20th January. One of the workmen in the employ of Mr. W. H. Chapman, builder, upon going through the grounds, at an early hour, found the bird (which had been wounded in the wing) dead, but the blood-stain fresh. The grounds of Hereford House cover an extent of about five acres, and contain many lofty trees, upon which there is a rookery, and are not at all a likely resort of a Harrier. I imagine the bird had probably been wounded in the outskirts of the town, and had dropped from exhaustion on the spot where it was found. Mr. Chapman was good enough to bring the specimen to me, as it appeared to him an uncommon bird, and I have preserved and added it to my collection. The specimen is in grey plumage, but is not an extremely old bird.—EDWARD HARGITT (1, Bedford Road, Bedford Park, Chiswick).

POMATORHINE SKUA AND OTHER BIRDS IN BEDFORDSHIRE.—One specimen only of the Pomatorhine Skua was, so far as I am aware, captured in Bedfordshire during the late autumnal immigration of Skuas. This one was shot at Ravensham, near Bedford, on the 18th October last. A male Goosander was shot on the 2nd December, at Compton Mills, by Mr. George Hare. On the 8th of the same month a male Bittern was

obtained at Chicksands Priory, by one of Sir George Osborn's keepers. A Great Crested Grebe was killed at Landy, on January 9th, by Mr. James Dillemore, as I am informed by Mr. Wright, the taxidermist, of Clifton. Curiously enough, with the exception of the birds above mentioned, this winter, as regards Bedfordshire, has been singularly unproductive in ornithological rarities.—C. MATTHEW PRIOR (The Avenue, Bedford).

ORNITHOLOGICAL NOTES FROM WEST CUMBERLAND.—An adult male Pomatorhine Skua was shot on October 16th, by some fishermen about ten miles off Whitehaven Harbour; it had a mate, which escaped. A single Bernicle Goose was seen flying about the mouth of the River Irt from the 20th October to the 3rd November, and seemed very tame. A flock of nine appeared on December 5th, near Seascale, flying towards the Irt. Two of them were shot near Braystones, and sixteen were seen at Drigg soon after. Several Goldeneyes have frequented this winter; one, a female, was shot on the 14th November. I notice that these birds are always seen at the same spot, where the river is still and narrow. The other ducks stay lower down, where it has widened into a small estuary. In the same bend an immature "Calloo," or Long-tailed Duck, was shot on the 22nd November, and sent to me; there were three more in company with it. A Scoter was shot on December 20th on the shore opposite Seascale Station; it sat stupidly on the water, about forty yards from the beach, and was deliberately "potted;" it was gorged with mussels and razor-shells, some of the latter being three inches long. At least one pair of Sheldrakes have wintered with us, which is unusual. During the second week of December three Swans were seen in several parts of this district, sometimes at the mouth of the river, and sometimes inland near the mountains. I am glad to say they were not fired at. On two occasions they were flying very near the ground.—C. A. PARKER (Gosforth, Carnforth).

ORNITHOLOGICAL NOTES FROM THE ISLE OF WIGHT.—Last summer a pair of Wagtails built a nest beneath the iron rail at St. John's Station, Ryde, and the young birds were reared, undisturbed by the constantly passing trains; and I am told by a railway official that a pair of Wagtails, some years since, constructed their nest in a similar manner at the same spot. The Land-rail was unusually abundant last summer in the Isle of Wight. In October a Great Snipe was shot at Atherfield, by Mr. T. Way; it is of rare occurrence in the island. A Brent Goose was shot on December 11th, at Luccombe; it rose from among the rocks on the shore, and on being fired at and wounded, settled on the water, where it was eventually secured. It proved to be a bird of the season, the patch on the neck obscure, there being little white about it. Owing to a malformation of the beak, the upper mandible was about half the length of the lower, but broader, well rounded, and decurved at the tip. The lower mandible and tongue partly exposed; this

deformity, the bill being uninjured by shot, must have greatly hindered the bird in feeding; it was in poor condition, and somewhat small in size.—HENRY HADFIELD (High Cliff, Ventnor, Isle of Wight).

GREAT BUSTARD IN KENT.—In addition to the list of Bustards recorded in 'The Zoologist' (pp. 25, 26) as killed in Cornwall, Essex, and Jersey, I have to report three recently obtained in Kent. The first of these was shot at Romney Marsh towards the end of December last, the sex of which I have not been able to ascertain. The second, an immature female bird weighing eight pounds and a half, was taken early in January at Great Chard, near Ashford; and the third, a full-grown male weighing sixteen pounds, was shot near Wye about the latter end of January. This bird had been observed by the occupier of the land it was on, and he was anxious that it should be left unmolested; but a trespasser, much to his annoyance, went in pursuit and shot it.—H. A. DOMBRAIN (Westwell Vicarage, Ashford, Kent).

GREAT BUSTARD IN ESSEX AND CAMBRIDGESHIRE.—On the 5th December last, a Great Bustard was procured by Mr. Porter near Chelmsford, and on February 6th. another, a hen-bird, was taken at Mr. Jonas's, at West Wickham, Cambridgeshire. Both are now in my hands for preservation.—T. TRAVIS (Naturalist, Saffron Walden).

[The specimen shot at Woodham Ferrers, Essex, on December 5th (*antea* p. 26), was, we have since ascertained, a hen bird, in good plumage, weighing 10 lbs. Length, 3 ft. 9 in. Extent of wings, 7 ft.—ED.]

GREAT BUSTARD IN DORSETSHIRE.—I have in my possession a Great Bustard which was shot on the 10th January last, in a turnip-field adjoining the Cranborne Downs. It proved to be a female bird, in fine condition, and weighed close on nine pounds.—EDWARD HART (Christchurch).

LITTLE BUSTARD AT EASTBOURNE.—On December 11th I shot a Little Bustard at Eastbourne. This rare and beautiful bird is the only specimen known to have been shot in the county of Sussex during the last century. The bird was in good condition; weight 2 lbs. 1 oz. It is now in the care of Mr. Swaysland, of Brighton, who will be pleased to allow any person to view the same.—MARTIN SPILLER (Devonshire Club, Eastbourne).

[It is a mistake to suppose that none have been killed in Sussex for a century. See Knox's 'Ornithological Rambles.'—ED.]

THE GREAT SHEARWATER: ITS POSTURE WHILE AT REST.—At a meeting of the Royal Physical Society of Edinburgh, on December 17th, a specimen of the Great Shearwater, *Puffinus major*, lately shot at North Berwick, was exhibited. This bird, which is now in the Edinburgh Museum, is stuffed in an upright position, after the manner of the Guillemots and other divers. While the rarity of the bird was remarked

upon it was also mentioned that, as this species had seldom or never been observed on land, the actual sitting posture was uncertain. I should now like to say a few words concerning this matter. I recorded in 'The Zoologist' of November, 1878, that one of these birds had been shot by my father in August of that year, at North Berwick. When shot this bird was sitting upon a large piece of wreckage floating about half a mile out at sea, and as the boat approached my father had a good opportunity of observing its attitude while at rest, which was as nearly as possible that of the Herring Gull, or other allied species, but certainly had no resemblance to the sitting posture of the *Alcidæ*. I would refer to the beautiful illustration of this bird in the third volume of Yarrell's 'British Birds.'—C. CHAMBERS (339, High Street, Edinburgh).

AMERICAN SWAN IN SCOTLAND.—On the 26th December, 1879, I noticed three Swans hanging in a poulterer's shop in Edinburgh. On going in I found there were five in all. Believing them to be Bewick's Swans, I sent down Hope, the birdstuffer, who bought and preserved four of them. Two were reserved for the Industrial Museum at Edinburgh, and the other two are in my possession. On dissection, however, they turned out to be adult specimens of *Cygnus americanus*—one male and three females. The sternum is fully two inches longer than that of Bewick's bird, and the formation of the windpipe also differs. The ribs were ten in number, and one specimen at least had twenty feathers in the tail. Three of them are to be exhibited at the next meeting of the Physical Society of Edinburgh, when a paper will be read on the subject. The fifth bird has been preserved in skeleton. Only one specimen of this species has been obtained previously in the British Isles to my knowledge. Three were shot in Argyleshire, and the other two at Tain, in Sutherlandshire.—CHARLES A. PARKER (Gosforth, Carnforth).

CORN CRAKE CARRYING ITS YOUNG.—The Landrail, or Corn Crake, usually frequents and makes its nest amongst long meadow-grass, generally depositing from four to six or seven eggs, sometimes as many as nine or ten. The broods are often too young to escape before the cutting begins, and the machine makes sad havoc among them; the bewildering sharp "clack-clack" of the machinery seems to stupefy both mother and young ones, so that the poor things are often maimed or killed. In August last, while cutting-down a field of grass, a Corn Crake was observed to rise close in front of the machine and to flutter backwards and forwards, crying pitifully; but, as it was impossible to stop before the scythe had passed over the spot, it was concluded the young had been killed. On looking round at the spot, however, soon afterwards, the mother was noticed where the nest had been, and presently she came out to the open field, carrying in her beak a small dark object, which, on following her, was found to be a

young Crake, evidently not more than an hour or two out of the shell, and too young to walk or run, but happily uninjured by the machinery. The old bird now laid down her helpless young one, and returned, apparently to look for the rest of the brood. The workman, however, having meantime found another, laid it beside the first; which, doubtless, the mother removed to a safe place, as on looking for them soon afterwards, all had disappeared.—M. ALLISON (Hollywood, Mulhuddart, Dublin).

THE HEBRIDAL ARGENTINE.—A most interesting fish was captured in Loch Alsh, near the Skye shore, last October, by a fisherman using a hand-line, the hook being baited with a piece of mussel. Yarrell, who received an example six inches and a half long from Glasgow, in November, 1837, termed it the "Hebridal Argentine"; it likewise was taken on a hand-line, in the Bay of Rothsay, about two hundred yards from the shore, in twelve-fathom water, where, though it was said to be well known, it was but rarely seen. Another, eight inches long and full of roe, was secured near the same place in June, 1836. A third has also been recorded from Redcar, captured in May, 1852. It appears to frequent the coast of Norway as well as that of Scotland, while a fish was washed ashore on the South Spit, Hokitika, New Zealand, which is described by Mr. Clarke in the 'Transactions of the New Zealand Institute,' 1878, p. 296, vol. xi., as *Argentina decagon*, which exactly agrees with the example of the Hebridal Argentine (*Argentina Hebridica*), now lying before me. Although Yarrell observed that it was "well known, but rarely seen," it does not appear that examples exist in our public museums. Couch observes that this fish "is not rare in the sea near the islands to the north of Scotland," but omits giving his authority for this statement, irrespective of which, he did not procure a specimen, and therefore inserted a figure from Schneider which is very unlike the Hebridal Argentine. The beautiful shining scales of this fish, its flat back, flat sides, and almost flat under surface, give it the appearance of being tetragonal. There are many questions as to its habits and internal anatomy which still require to be investigated. It is believed that, in Europe, it lives at great depths, and never enters fresh water. In Norway it is stated to be usually captured after cold and stormy weather. Mr. Clarke suggests whether, if his species is identical with the European form, it had worked its way *sub mare* in the cold strata of water from the northern to the southern hemisphere.—FRANCIS DAY (Kenilworth House, Pittville, Cheltenham).

LATE STAY OF PILCHARDS AND EARLY ARRIVAL OF MACKEREL ON THE CORNISH COAST.—A circumstance which has no precedent within the memory of the oldest fishermen here seems worth recording. Usually the Pilchard season ends on our coast at St. Ives with November. Occasionally

a stray shoal has been taken in, and even at the end of, December, but this is quite an exceptional occurrence. This last season has run right on into January, and the fishing of the latter part of the season has been more productive than that of the earlier part. Usually the Mackerel do not arrive on our western coasts until the end of February. This year they are with us already (28th January). I can offer no explanation of these remarkable facts.—THOMAS CORNISH (Penzance).

POPULAR NAMES OF ANIMALS.—I am preparing for the English Dialect Society a dictionary of the popular names of animals, reptiles, crustacea, and insects; in fact, of all zoological objects excepting birds and fishes, which are in the hands of the Rev. C. Swainson and Mr. T. Satchell respectively. I shall be very grateful for any help which the readers of 'The Zoologist' can afford me.—JAMES BRITTEN (British Museum).

THE LATE MR. EDWARD HEARLE RODD.—A valued correspondent and one of the oldest contributors to the pages of 'The Zoologist' has passed away, in the person of Edward Hearle Rodd, who died at Penzance on the 24th January last, from a combined attack of bronchitis and pleurisy. It is with unfeigned regret that we record this event, a regret which we feel sure will be shared not only by those of our readers who were personally acquainted with him, but by those also who knew him only by correspondence and by his published communications to this journal. Mr. Rodd was one of those who took the greatest delight in out-door observation, and especially the observation of the feathered tribes. From the year 1843, when this journal was commenced, until the time of his death, at the age of sixty-nine, he was in the constant habit of taking notes on his favourite subject, which he communicated from time to time to these pages; and very valuable many of these notes are. Owing to the zeal and exertion of Mr. Rodd, many a rare bird in Cornwall has been rescued from oblivion; while several species, such as the Spotted Eagle, Lesser Grey Shrike, Red-breasted Flycatcher, and American Little Stint, have been added to the British list entirely through his instrumentality. He was especially interested in the subject of migration, and the large number of facts which he has recorded in connection therewith, not only in these pages, but in the 'Journal of the Royal Institution of Cornwall,' and in the Natural History columns of 'The Field,' will be found of material value by those who may desire reliable statistics from which to generalize.

In 1864 Mr. Rodd published an octavo pamphlet of forty-two pages, entitled 'A List of British Birds, as a Guide to the Ornithology of Cornwall,' a second edition of which appeared in 1869. At the date of his death he had for some time been engaged, at our earnest entreaty, in the

preparation of a more extensive work on the Birds of Cornwall; and we are happy to state that, the whole of his MS. notes for this work having been placed in our hands, steps were at once taken to secure its publication in a form calculated to benefit science and enhance the reputation of the author. Five sheets, or eighty pages, were revised by Mr. Rodd, the fifth sheet only a week before his death, and it is much to be regretted that he has not lived to see the completion of an undertaking in which he took so much interest. The work, however, will proceed, and its publication, by Messrs. Trübner and Co., may be shortly expected.

In the county in which he resided Mr. Rodd was greatly esteemed and respected. The third son of the Rev. Edward Rodd, D.D., he was born at St. Just in Roseland, of which parish his father was vicar, in March, 1810. Educated for the law, he was admitted to practice as a solicitor in Trinity Term, 1832, and early in the following year went to reside at Penzance, where he entered into partnership with Mr. George Dennis John. At Mr. John's decease, Mr. Rodd was joined by Mr. Darke, and, soon after the death of the latter, the firm became Messrs. Rodd and Cornish. About two years ago Mr. Rodd retired from the firm, resigning at the same time the office of Town Clerk of Penzance, to which he had been elected in 1847, and of Clerk to the Local Board, to which he was appointed in 1849, Penzance having been the second town in England to adopt the Public Health Act, 1848. Mr. Rodd at the same time resigned the Clerkship to the Penzance Board of Guardians, an office which he had held from the passing of the Poor Law Act. Both the Penzance Corporation and the Board of Guardians accepted his resignation with regret, and gave expression to their appreciation of long and faithful service. In addition to the offices above mentioned, Mr. Rodd was Superintendent Registrar, and, from 1844 till the abolition of the office in 1867, Head Distributor of Stamps in Cornwall. Of the Penzance Choral Society he was one of the founders and warmest supporters, nothing but illness or absence from home keeping him away from the practices. By his death a vacancy is created in the Vice-Presidency of the Society, a position he had occupied from the first. Mr. Rodd also took a deep interest in St. Mary's Sunday Schools, of which he was one of the oldest teachers, and but a few weeks before his death he presided at a New Year's entertainment given to the boys.

The welcome guest in many a country house between the Land's End and the Tamar, Mr. Rodd took the liveliest concern in the welfare of the poor, to whom he was known to be a liberal friend. The fishermen, especially, will have cause to regret his decease, since he always had their interests at heart. By his death (says the Editor of 'The Cornish Telegraph'), "Penzance has lost an adopted son whom she delighted to honour, as a man of unblemished character, urbane and courteous to the highest degree, and one whose greatest delight was in serving a friend, or

advancing the interests of those whose only claim on him was that of a common humanity."

We understand that Mr. Rodd's fine collection of Cornish Birds, many of them extremely rare, and all beautifully mounted by Mr. Vingoe, of Penzance, have been removed to the residence of his elder brother, Mr. Francis Rodd, of Trebartha Hall, by whom they will be carefully preserved.

THE LATE DR. T. M. BREWER.—Ornithologists will hear with deep regret the news of the death of Dr. Thomas Mayo Brewer, of Boston, Mass., which took place on January 23rd, after a short illness. The grandson of Colonel James Brewer (a leader of the "Boston tea party" of 1773, and an active partisan in the subsequent revolution), T. M. Brewer, born in Boston in 1814, took an early and lively interest in politics and also in Natural History—these widely divergent subjects furnishing, however, for some time merely the occupation for the leisure hours spared from his duties as practising physician. This versatility of talent led to connection in an editorial or managerial position with several important journals; but it is as an ornithologist that we must now speak of him, for as such he is most widely known on this side of the water. In 1839, when only twenty-five years of age, Dr. Brewer had already brought out a new edition of Wilson's 'Ornithology,' with a synopsis of all the North American species then known; and years later he commenced his 'Oology of North America,' a grand work, of which only one volume was issued, the great expense causing the relinquishment of its publication by the Smithsonian Institution. In conjunction with Prof. Spencer Baird and Mr. R. Ridgway, he commenced, in 1874, a 'History of North American Birds,' and in addition to these more important works he was an active and valuable contributor to the 'Bulletin of the Nuttall Ornithological Club,' one of the best quarterly journals in existence on the subject of birds and bird literature. During a recent residence of two years in Europe many of us had the opportunity of enjoying his genial society, and to those who did not know him personally, his writings and correspondence, sparkling as they were, can convey but little idea of the loss his friends have sustained.—*From 'The Field.'*

PROCEEDINGS OF SCIENTIFIC SOCIETIES.

LINNEAN SOCIETY OF LONDON.

January 15, 1880.—Prof. ALLMAN, F.R.S., President, in the chair.

Messrs. John Poland (Blackheath), J. Darell Stephens (Plympton), and Prof. Allen Thomson were elected Fellows, and T. Jeffery Parker (Tooting) an Associate of the Society.

Mr. A. J. Hewett exhibited and made remarks on a common web or community of cocoons and the moths (genus *Anaphe*?) escaped therefrom, said to have been brought from Old Calabar.

Some Moa's bones,—*viz.*, a tibia and tarsus of a specimen of *Dinornis maximus*,—obtained four feet from the surface at Omaru, New Zealand, were shown on behalf of Mr. James Forsyth.

A paper was read "On the Birds and Mammals introduced into New Zealand," by H. M. Brewer, Hon. Sec. Wanganui Acclim. Soc., New Zealand. The author refers to Dr. Buller's volume on the New Zealand Avifauna as not written too soon, for the rapid disappearance of many highly interesting forms is already to be deplored—to wit, the Kakapo (*Stringops habroptilus*), New Zealand Quail (*Coturnix Nova-Zelandiæ*), Bell Bird (*Anthornis melanura*), &c. But to import English birds to employ their places is not without its difficulties. Native enemies are to be contended with; for example, the New Zealand Owl (*Ninox Nova-Zelandiæ*), wages destructive warfare against the smaller finches and song birds. Of one hundred Diamond Sparrows liberated on the island of Kawan, by Sir George Grey, few escaped the ravages of this little Owl; and on the Hon. Mr. Stafford's grounds at Wellington a number of insectivorous birds being let loose soon attracted a host of these Owls, to the serious discomfiture of the former. Finches of various sorts have nevertheless succeeded, and undoubtedly increased to such an extent that there is now no danger of their extermination. The Sky Lark may even be found enlivening some districts with its cheerful varied music. Of other species acclimatised, may be mentioned the Starling, Thrush, Blackbird, Chaffinch, Goldfinch, Yellowhammer, House and Hedge Sparrow, Indian Minah, Ring Dove, Golden Plover, Jay, Australian and Tasmanian Magpies, Muscovy Duck, Black and White Swans, Californian, Australian and Madagascar Quails, Partridges, Pintail Grouse, and Pheasants of various sorts, &c. The Pheasant now abounds, and even shooting licenses are granted. Fifteen birds were turned out in the Wanganui district in 1866; these have now spread all over the province, even far inland. Two friends of the author bagged seventy in one day, and this by plain open shooting. The Chinese Pheasant (*P. torquatus*) is most numerous, although the common sort (*P. colchicus*) is increasing. It is a singular circumstance that on the occurrence of a tremor of the ground from an earthquake, the cock Pheasants set up a continuous crow either of fear or defiance. In the North Island the Partridge (*Perdix cinerea*) thrives less vigorously than in the South Island; Canterbury, especially, with its cereal crops, affording a better feeding and breeding ground. The Red-legged Partridge (*Caccabis rufa*) is plentiful in the Rangiteiki district of the Wellington Province, but appears to remain where first located. Blackbirds and Thrushes and the Indian Mynah (*Acridotheris ginginianus*?) are seen in large numbers in the

Nelson Province. Of Mammals imported by the Societies, the following are the chief;—The Red, Fallow, Sambur and Californian Deer, Angora Goat, Hare, Kangaroos, Wallabees, and Opossums. A consignment from England of thirty-three Fallow Deer was lately made by Mr. Larkworthy, and of twenty-eight which arrived in safety eighteen were turned out in the Waikato and ten in the Wanganui district. On the hills in the neighbourhood of Nelson large herds of wild Red Deer are reported to have been seen. Fallow Deer set free near Richmond have increased. Hares have increased almost too rapidly, and one particular feature is their fecundity in New Zealand, for the female brings forth six and seven at a birth. Already southern farmers complain of the Hares being too numerous, and Coursing Clubs meet bi-weekly during the season. Thus, from a former paucity of mammalian life in New Zealand, there is now a tendency to the contrary, and possibly in a few years its fauna will have approximated to that of the mother country.*

February 5.—WILLIAM CARRUTHERS, F.R.S., Vice-President, in the chair.

Dr. Francis Day exhibited examples of *Salmonidæ*, some of which had been reared under natural and others under unnatural conditions. A *Salmo fontinalis* which had passed its existence in the Westminster Aquarium had the head preternaturally elongated with a very narrow suboperculum; thus showing a great contrast to examples reared in Cardiganshire from the same batch of imported eggs. He also exhibited a very slender young Salmon, reared by Mr. F. Buckland in the Horticultural Gardens, where, of course, its instinctive migration to the sea had been prevented.

Mr. A. Hammond showed under the microscope a larva of *Tanyptus maculatus*. He mentioned that the coronet and appendages of the thoracic and anal regions had been said to be homologous with the respiratory organs of the larva and pupa of gnats, &c. This he doubted, inasmuch as the former originated from the ventral, and not from the dorsal, surface, as did the latter, and no tracheæ of any size could be discerned. He also stated his opinion that the two oval bodies in the thorax of the larva, which De Geer considered as reservoirs of air, were probably salivary glands similar to those he (Mr. Hammond) had previously observed in the larva of the crane-fly.

The Secretary then read a communication by H. M. Brewer, Hon. Sec. Wanganui Acclim. Soc. New Zealand, "On the *Salmonidæ* and other Fish introduced into New Zealand Waters."—J. MURIE.

* We cannot too strongly reprobate the practice, which seems to be gaining ground, of introducing into the colonies animals which will eventually cause the extermination of many remarkable indigenous forms, and which lead to much confusion in zoo-geographical science.—ED.

ZOOLOGICAL SOCIETY OF LONDON.

January 6, 1880.—Prof. FLOWER, LL.D., F.R.S., President, in the chair.

Prof. Newton exhibited, on behalf of Mr. G. B. Corbin, a specimen of the Needle-tailed Swift (*Acanthyllis* sive *Chatura caudacuta*), shot near Ringwood, in Hampshire, in July, 1879, remarking that it was the second example of this Siberian species which had been obtained in England.

Mr. John Henry Steel read a series of preliminary notes on the individual variations observed in the osteological and myological structure of the Domestic Ass (*Equus asinus*).

A communication was read from Mr. E. W. White, containing notes on the distribution and habits of *Chlamyphorus truncatus*, from observations made by the author during a recent excursion into the Western Provinces of the Argentine Republic, undertaken for the purpose of obtaining a better knowledge of this animal.

Dr. John Mulvany, R.N., read a paper on a case which seemed to him to indicate the moulting of the horny beak in a Penguin of the genus *Eudyptes*.

Mr. O. Thomas read a description of a new species of *Mus*, obtained from the island of Ovalau, Fiji, by Baron A. Von Hügel, and proposed to be called *Mus Huegeli*, after its discoverer.

A communication was read from Mr. R. G. Wardlaw Ramsay, containing a report on a collection of birds made by Mr. Bock, a naturalist employed by the late Lord Tweeddale, in the neighbourhood of Padang. Three species were described as new, and proposed to be called *Dicrurus sumatranus*, *Turdinus marmoratus*, and *Myiophoneus castaneus*.

Dr. Günther read a description of two new species of Antelopes of the genus *Neotragus*, *N. Kirki*, from Eastern Africa, and *N. molaris*, from Damara-land.

January 20.—Prof. FLOWER, LL.D., F.R.S., President, in the chair.

The Secretary read a report on the additions that had been made to the Society's Menagerie during the month of December, 1879, amongst which special attention was called to a pair of Prong-horn Antelopes, purchased December 4th; and to two rare species of Parrots, of the genus *Chrysotis*, purchased December 18th.

Mr. H. N. Moseley exhibited and made remarks on some microscopic preparations of Corals made by a new method invented by Dr. G. V. Koch.

Prof. Flower read a letter addressed to him by Colonel Heysham, of the Madras Commissariat Staff, giving particulars of two cases of female Elephants, in India, having produced young in captivity.

Dr. A. Günther exhibited and made remarks on a drawing of a West Indian fish (*Holacanthus tricolor*), obtained on the coast of the island of Lewis, and believed to have been found for the first time in the British Seas.

Mr. P. L. Slater read some remarks on the species of the genus *Tyrannus*, in relation to a paper on this subject recently published by Mr. Ridgway, in America.

A communication was read from Mr. Roland Trimen, containing an account of a new species of Roller (*Coracias*), from the Zambesi, which he proposed to name *C. spatulata*, from its long spatulated tail.

A communication was read from Mr. Alexander Agassiz, of Cambridge, Mass., containing notes on some points in the history of the synonymy of *Echini*, in reference to some papers recently published by Mr. Bell in the Society's 'Proceedings.'

A paper was read by Mr. F. Moore on the genera and species of the Lepidopterous subfamily *Ophiderinæ*, inhabiting the Indian Region.

February 3.—Prof. FLOWER, LL.D., F.R.S., President, in the chair.

Capt. W. Vincent Legge, R.A., exhibited and made some remarks upon some specimens of the Little Ringed Plovers of India and Ceylon.

A communication was read from Dr. G. Hartlaub, containing the description of a new species of Heron, obtained in Mohambo, in Northern Madagascar, which he proposed to name *Ardea Rutenbergi*.

Mr. Oldfield Thomas read a note on a specimen of *Myoxus elegans*, Temminck, which had been obtained by Mr. H. Pryer, near Yokohama, Japan.

A communication was read from Mr. H. N. Moseley, containing the description of a new species of Simple Coral, which he proposed to call *Desmophyllum lamprosteichus*.

Prof. F. Jeffrey Bell gave an account of *Palæolampas*, a new species of irregular *Echinoidea*, which presented, among others, the following archaic points:—(1) the rows of pores were completely parallel, and extended regularly to the ambitus; (2) some of the pores exhibited an elongation indicating the appearance of the connecting groove; (3) the outer row of each pore-series was continued uninterruptedly to the actinostome; and (4) two of the ocular pores retained indications of their primitively double character.

Messrs. C. J. Danford and E. R. Alston read Part II. of a paper "On the Mammals of Asia Minor," in which they added certain species to their former list, and described a new species of Vole under the name of *Arvicola Guentheri*.

Mr. Slater exhibited and made remarks on a fifth collection of birds from Duke of York Island and its vicinity, which he had received from the

Rev. George Brown. Four species were described as new, and proposed to be called *Megalurus interscapularis*, *Pacilodryas æthiops*, *Munia melana*, and *Rallus insignis*.—P. L. SCLATER, *Secretary*.

ENTOMOLOGICAL SOCIETY OF LONDON.

December 3, 1879.—J. W. DUNNING, M.A., F.L.S., Vice-President, in the chair.

Donations to the Library having been announced, and thanks voted to the respective donors, the Chairman read out a list of the names of the Officers and Council proposed for election on January 21st, 1880.

Mr. Howard Vaughan exhibited a series of remarkable varieties of *Lycæna Corydon*, taken at Dover, one specimen, a female, being suffused with blue on the upper side of the left pair of wings only, whilst the right wings were uniformly brown.

Mr. W. L. Distant exhibited a hitherto unrecorded variety of *Danaïs plexippus*, Linn. (commonly known as *D. archippus*), received from Antigua, in which the rufous coloration was quite absent, the ground colour being dull pale testaceous. Although another similar specimen was received, the variety could not be considered as a local form, Antiguan specimens of the species usually being typical.

Mr. T. R. Billups exhibited the following beetles;—*Pseudopsis sulcata* (Box Hill); *Agathidium nigrinum* (Caterham Valley); *Anisotoma grandis* (Box Hill); *Leptinus testaceus* (Burford Bridge); and *Carabus auratus*, taken in the Borough Market.

Mr. C. O. Waterhouse mentioned a remarkable instance of tenacity of life observed by Dr. Percy in a specimen of *Curculio cleonus*.

The Rev. H. S. Gorham read a paper entitled "Materials for a Revision of the *Lampyridæ*."

In connection with the light-emitting power of this family, Mr. Bates remarked that certain species of Longicorns mimicked Lampyrids with great exactness, the light-giving segments of the latter being perfectly represented in the Longicorns, although destitute of phosphorescent power.

Mr. J. W. Slater communicated a paper "On certain Minute Characters of Insects, with reference to the Theory of Evolution."

Mr. Roland Trimen communicated a paper "On some hitherto undetermined Butterflies inhabiting Southern Africa."

Mr. P. H. Gosse, F.R.S., communicated a paper "On *Papilio Homerus*, its Ovary and Larva," the habitat of which is limited to restricted regions in the island of Jamaica.—R. MELDOLA, *Hon. Sec.*

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NOTES ON THE ORNITHOLOGY OF THE BRITISH POLAR EXPEDITION, 1875-6.

By HENRY CHICHESTER HART,
Naturalist on Board H.M.S. 'Discovery.'

GREENLAND FALCON, *Falco candicans*, Gm.—Upon the 16th July, 1875, I saw a bird of this species leaving a “loomery” in Svarte-vogel Bay, near Rittenbank, lat. $69^{\circ} 42'$, with a bird in its talons. Afterwards, on August 19th, 1875, I watched a pair for some time circling around their eyrie amongst lofty cliffs near Cape Hayes, lat. $79^{\circ} 44'$. They alighted several times, but scarcely descended below their inaccessible breeding-place, about a thousand feet above the ice-foot where I stood. Their wide flights and spreading gyrations were quite like those of the Peregrine Falcon under similar circumstances, but, unlike that bird, they maintained silence. At the end of May, 1876, a bird was seen to alight on a snowy bluff, about three hundred yards from the ship, in Discovery Bay, lat. $81^{\circ} 42'$. It was watched through a glass for some minutes, but flew away when a gunner attempted to approach it. From the description given to me afterwards I concluded it could only be a Falcon. On the homeward voyage Falcons were several times seen; on August 21st, 1876, at the breeding-place of last season, and several times about the ship in September; upon the 17th one perched on the fore-royal truck when near Proven, lat. $72^{\circ} 20'$. The last Falcon I saw was at Godhavn on September 25th, 1876.

SNOWY OWL, *Nyctea scandiaca*, Linn.—We saw no Snowy Owls until reaching Discovery Bay; they were abundant there from

May till the end of July and the beginning of August, when, having reared their young, the majority went southwards. I am inclined to believe some remain in the vicinity of Discovery Bay throughout the winter. Their food is almost exclusively the Lemming, which is always to be had in abundance, and the following extracts from my journal will show that owls can exist in these latitudes, independently of the extreme changes in light and temperature:—

“October 22, 1875. Hans, our Esquimaux hunter, saw an owl kill a hare, and had nearly devoured it, flying off, when he disturbed it. The temperature was then -29° Fahrenheit, and the sun had been below the horizon at midday for a week. This was nearly three months after their regular migration had taken place.”

“February 29, 1876. I found a freshly-discharged pellet upon the snow, with some blood and a portion of a Lemming's entrails close by; in a day or two these would have been covered by the light drifting snow. The temperature was -59° Fahr. The pellet was entirely composed of Lemmings' bones and fur.

“March 2, 1876. An owl was seen by Hans. The mean temperature of the day was -63.4° Fahr. This was the coldest week we experienced.”

Snowy Owls were noticed in pairs from the 18th May onwards. The first nest was found on June 15th, and contained nine hard-set eggs. Upon this occasion, and a few others, there was a pretence for a nest of hay and some of the owl's feathers; as a rule, the eggs were laid upon the bare earth, often with a surrounding of snow. As early as the 17th June I saw a young one able to fly, its plumage being of a dark greyish black. Within fifteen miles of the ship there were found no less than twenty-six nests of the Snowy Owl, and as many as four within an area of one square mile; of these I observed six to contain nine eggs each; eight had eight eggs each; while the rest were not discovered till some young had flown; nine was, however, the maximum number of eggs observed. It is usual, when the season has advanced, to find young of different ages and eggs in the same nest, a week or more elapsing from the time of laying the first egg till the full number has been completed; no doubt the parent cannot leave its eggs unprotected in consequence of the extreme cold. The eggs are almost spherical and of a snowy whiteness;

those gathered by me were never discoloured except when addled or containing young; one or two addled eggs occurred in every nest, and these were left entire after the young had flown. When an owl's nest is approached closely the male bird flies at the intruder's face, snapping its beak loudly and quickly, and swerving off so closely as to let one feel the wind from its wings. At these times the bird is a splendid sight, its large yellow eyes blazing with rage as it swoops down at an angle of about forty-five degrees from a distance of thirty or forty yards straight for the enemy's face. The final swoop of the male was always made when the nest was discovered, and upon one or two occasions the bird fell a victim to its daring from a blow of the gun-barrel. While this was going on the female, who is generally flying around or seated at a safe distance, keeps up a loud, angry screaming. The other cries of the owl were a deep note, half "coo" and half "hoot," which is made by the male when a stranger approaches the breeding-place, and a deep "quack," which the female makes when she first leaves the nest. After a little practice one can interpret these notes so as to discover the nest without any difficulty. The eye of the Snowy Owl is very beautiful, the pupil black, the iris broad and golden yellow, with an outer ring of black. The flesh of the Snowy Owl is white and of a delicate flavour, the skin being extremely thin and difficult to preserve. A pinioned adult male, captured during the breeding season, and kept in confinement, refused all food and died in a few days. Many young were reared, and a few lived till we reached the Atlantic, but none survived the passage.

The very old male is pure, unspotted white throughout, and remains so throughout the summer. Females and young males are more or less spotted with reddish or greyish brown, especially upon the wings and wing-coverts; the latter feathers are the latest to become white. The males become less spotted as they advance in age; but of a pair the male is always the least marked, the female never, I believe, becoming purely white. The male owl takes great care of his mate while hatching, laying by her side a store of lemmings in tempting array; six to a dozen was a common provision, but in one case as many as twenty-seven lemmings and the remains of a full-grown hare were arranged around the nest containing young and eggs. I have seen these supplies surrounding the nest containing eggs alone. It will be

seen that upon two occasions I found the Snowy Owl feeding upon other food besides lemmings. Another instance was noticed by the Rev. C. Hodson, the Chaplain of our ship; he had wounded a Brent Goose, and while following it an Owl pounced upon the bird and tumbled it over and over. I have several times watched the Long-tailed Skua, *Lestris parasiticus*, harassing an Owl in a most insolent manner, flying at its head while seated in majestic indolence, flapping its wings and tail in its face, and screeching discordantly close to its ear, while the Owl preserved a dignified composure. Nor is the Skua the Owl's only enemy. Once I found the shells of freshly-devoured owls' eggs, while a quantity of Fox's fur attested to a severe conflict. Another time a Wolf, which was seen to leave the floe and make inland, was tracked and in his path were found the wings and tails of a brood of young owls, which he had found time to devour on his way.

From the middle of May Snowy Owls kept arriving, and by the middle of June they were breeding in numbers. By the beginning of August they had nearly all disappeared. Their residence at their breeding-quarters is thus about two months and a half, and this is rather more than the stay of most other species. Snowy Owls appear to have been by no means common in Polaris Bay, lat. $81^{\circ} 40'$, but Dr. Coppinger saw and gathered their pellets in several places. The following measurements will show the dimensions of a freshly-killed Arctic specimen, a female shot June 16th, 1876:—Entire length, 24 inches; length of tarsus, 2.10 in.; length of bill along ridge, 1.11 in.; length from rictus to outer edge, 1.10 in.; length of middle toe, 1.7 in.; length of claw on curve, 1.5 in.; length of tail past wing, 1 in.; extent of wings, 58 in. First quill 1.10 inch shorter than second; second, 4 inches shorter than third; third equalling the fourth, and third and fourth longest.

WHEATEAR, *Saxicola ænanthe*.—I saw Wheatears along the shores of Svarte-vogel Bay, and again at Proven; in each case a pair, and evidently breeding.

SNOW BUNTING, *Plectrophanes nivalis*.—This was the most universally distributed bird along the shores we visited. Its friendly and cheering song at once renders it a favourite with the Arctic traveller. Its notes are varied, sweet, and lively. The common cry is the single plaintive tone of the Yellowhammer, while its song reminds one forcibly of the Whitethroat and of the

Sedge Warbler. The male, too, will sing while hovering on the wing, when notes of the Green Linnet and Hedgesparrow are exactly reproduced. At Disco, lat. $69^{\circ} 15'$, I found two nests; both were inaccessible, one being high up upon a ledge on a precipitous cliff, and the other out of reach in a cranny in a rock. The parents fed their young as I stood watching a couple of yards off; they showed no alarm whatever. The young, four in number, were covered with a very dark down. The parents, if watched, will always betray the whereabouts of their nest. At Disco I met with Snow Buntings at an altitude of 3200 feet above sea-level; there were a couple of birds, and I observed no other instance of animal life at so great a height in high latitudes. Upon the 29th September, 1876, Snow Buntings had left Egedesminde, lat. $68^{\circ} 40'$. They were met with all along the coast to Discovery Bay, where they remained till the first week of September, 1875; after which they disappeared. In the following year I first observed them at Polaris Bay, upon the 15th May, when a flock of eight came down along shore from the northward. On the following day more arrived from the same direction; they had appeared a few days previously at Discovery Bay, upon the opposite coast. By the 20th June they were hatching their eggs; four nests I found in our winter quarters contained respectively, one, three, and (in two cases) seven eggs each. Young birds had flown from the first two, so that seven appears to be the usual number of eggs. The nests were snugly built of dry grass, lined with owls' feathers usually, but sometimes geese feathers and musk-ox wool were used. The eggs are of a greenish grey ground-colour, the size and shape of a Yellow-hammer's, with blots of a reddish chocolate-brown hue, more numerous at the larger end, and mostly oval and directed lengthwise upon the shell; there are few streaks, and none of the bold, fanciful markings met with on the eggs of our British Buntings. The plumage of the earliest seen Snow Bunting in 1876 was as follows:—Breast, head, abdomen, tail-coverts, and secondary wing-feathers, white; other wing-feathers, black or flecked with black; back-feathers and wing-coverts, brownish black, toned off to the end with reddish brown. The chief food of Snow Buntings seems to be the flower-heads and seed-tops of *Drabas*, *Papaver nudicaule*, &c.; earlier in the year they subsist on the budding leaf-shoots of *Saxifraga oppositifolia*. I have also watched them

picking up caterpillars. Dr. Coppinger informed me that Snow Buntings were common in Polaris Bay throughout July, 1876.

LAPLAND BUNTING, *Plectrophanes lapponica*.—Far less numerous than the last species, and I did not meet with it north of Disco; there, however, I observed several pairs. This bird is more silent and retiring than the Snow Bunting, and its song is more subdued and plaintive, at times much resembling that of the Redbreast. On the 10th July I found a nest of this species by the little lake at Blase Dalen, in Disco, with four young. The nest was composed of dry grass and small twigs, deep, and lined with hair and feathers; it was placed in an under-growth of *Salix arctica* and *Archangelica officinalis*, about a foot and a half above the ground. The young were clad with a dark down. The female parent suffered herself to be lifted from the nest and replaced without attempting to escape, while the male kept up a continual angry chattering, flying almost into my face.

RAVEN, *Corvus corax*.—On the 13th July, 1875, I saw a pair of Ravens at Englishman's Bay, in Disco; they had a breeding-place to the west of that near the shore. On the 4th September, 1876, I saw a pair at Lyell Bay, lat. $79^{\circ} 32'$, and on the 30th and following days they were very numerous at Egedesminde, where they live upon shell-fish, dead fish, and other sea-shore garbage. They are protected there, as they are invaluable scavengers. Seven or eight of these birds pursued one of our Discovery Bay Esquimaux puppies, which I endeavoured to bring home to England, and drove the terrified animal into the water, pecking at its eyes and buffeting it about the head with their wings. In the middle of July, 1876, a pair were constantly seen about Polaris Bay; they had their nesting-place at Cape Lubton, a little to the northward. This appears to be the most northern settlement of the Raven.

ROCK PTARMIGAN, *Lagopus rupestris*.—On the 7th July, 1875, I saw one Ptarmigan at Disco. Having no gun the bird escaped, though admitting of approach within a couple of yards; this was at an altitude of about 2000 feet, and the bird was snowy white. Ptarmigan were subsequently obtained, or observed, at various points between Disco and Discovery Bay. The southern shores of Hayes Sound seemed perhaps the best adapted places for their support. With the exception, perhaps, of the Snowy Owl, the present species appears to be the hardiest northern

bird: on October 10th, 1875, I shot one in Discovery Bay, and as late as the 12th a flock of five was seen flying southwards. The following is a description of the specimen, a male, of October 10th:—All the plumage white, with the exception of under tail-feathers; a patch around either eye, which extended from base of bill; and the shafts of the first five or six wing-feathers, which were black. There was also one brown and white feather in each rank of secondary wing-feathers. A patch of orange-coloured skin was exposed above the black feathers over the eye. The crop contained a considerable quantity of willow-tops (*Salix arctica*), withered flowers and capsules of *Pedicularis hirsuta*, shoots of *Stellaria longipes*, and leaves of *Dryas integrifolia*. Willow-tops predominated, and the examination of a number of specimens led me to conclude that that is their favourite, and often their exclusive food. In 1876, on the 5th March, Hans saw fresh Ptarmigan-tracks, and on the 30th individuals were seen. On the 7th April a male was shot in snowy white plumage, save two mottled breast-feathers. On the 10th April I took the following description of a female I shot in Discovery Bay:—Snowy white with the exception of a black patch on either side reaching from upper mandible under the eye to half-an-inch behind it. Reddish orange streak above the eye conspicuous. Tail-feathers fourteen, black, with white tips which disappeared in the outer ones; these were surrounded by six white tail-coverts equal, or nearly so, in length; the black feathers show conspicuously in a flight over the snow, rendering the bird, which would otherwise be very difficult to distinguish, an easy mark for the gunner. The third and fourth wing-feathers are the two longest, the third the longest of all. Two mottled feathers appeared on the breast. The nails black and the hair-like toe-feathers reaching nearly to their extremity. Bill black and broad. Shafts of first six wing-feathers brown. Weight, 1 lb. 7 oz. Total length, 15 inches; of tail, 5 in.; of wing, 8·5 in.; of bill to rictus, 1 in.; of tarsus, 1·3 in.; of middle toe, 1·1 in.; of middle nail, ·7 in.; of bill, above, ·7 in. On the 17th June I shot a hen Ptarmigan in the full mottled-brown summer plumage. On the 27th I shot a male in perfect winter plumage, except for one or two minute brownish feathers on the top of the head. On July 27th and August 2nd, Ptarmigan were shot in partial plumage; these were both

females. One which had been hatching had all the feathers mottled-brown without white, except the primaries and first half of the secondaries, which were pure white. There was some white also upon the wing-coverts. The males seem to change less in summer, and the old males, as in the case of the Snowy Owl, hardly at all. On the 10th May, 1876, I noticed Ptarmigan-droppings at Polaris Bay. Dr. Coppinger did not observe this bird there during the previous July.

TURNSTONE, *Streptilas interpres*.—On the 25th August, 1875, Turnstones, young and old, were collected in small flocks preparatory to leaving Discovery Bay. They were then feeding along the shore, all their means of subsistence inland being frozen up. In 1876 two or three Turnstones arrived on the 29th May; on the 5th June I shot a male in beautiful summer plumage; by the 6th and 7th they were of frequent occurrence, and I saw a few passing to the north in small flocks. The Turnstone, like all other birds in Discovery Bay, is always at war with the Long-tailed Skua, flying at and insulting him with great courage. Turnstones, though feeding along shore at the close of their visit, subsist during the summer upon bees, caterpillars (*Argynnis chariclea*, Sch., and *Dasychira grænlandica*, Wocke), and Tipulæ. The stomachs of several examined were almost entirely filled with caterpillars, and I often watched them with a powerful glass and wondered at their dexterity in finding them. The summer note of the Turnstone is loud and pleasant: a twittering chatter of two notes quickly repeated, which is produced by the male bird while watching near the nest. On the 12th and 24th July, 1876, two nests were found with four eggs each; on the 1st August I saw a brood of four young, just able to fly; on the 6th there were many young about, and by the 9th they were feeding in small parties along the shore. The first nest was found by one of the sailors in a valley about three miles inland; by my instructions he left it untouched for me to see *in situ*; but, having taken insufficient bearings, when we returned together, he could not re-discover it. The ground was covered with a uniform grey shingle with scattered patches of brown herbage. For upwards of an hour did we cross and re-cross an area of about fifty square yards, within which limits my companion was positive that the nest was placed, the parents flying round in much agitation all the time. At last, in despair

of thus finding the eggs, and fearful, moreover, of treading on them, I withdrew to a hillock about a hundred yards off, and watched the female through my field-glass, the male having deserted his post when he thought we had left. After a few minutes she alighted, and while watching her threading her way for about ten yards among the stones, to my delight, four eggs came within my field, and in another second she was between me and them. Even then, so exactly did both eggs and parent resemble their surroundings, it was with difficulty we could see the nest, and, even while actually looking at the eggs, it was hard to distinguish them from the pebbles and herbage around. The nest was composed of white lichen and *Dryas*-leaves, loosely laid together upon a hollow in a tuft of the latter. The eggs were rather pointed, and in colour and marking like those of the Long-tailed Skua, with the ground-colour less greenish in shade. In Polaris Bay Dr. Coppinger observed Turnstones frequently in July, 1876.

(To be continued.)

ORNITHOLOGICAL NOTES FROM THE COUNTY MAYO.

By ROBERT WARREN.

THE cold wet summer of 1879 appears to have been, in this locality, almost as disastrous to our smaller summer visitants as the previous winter was to our residents and winter visitants. According to the register of the rainfall for 1879, kept at Markree Castle, County Sligo, by Colonel Cooper, there fell during the first quarter of the year, 8·73 in.; in the second, 9·61 in.; the third, 15·68 in.; and in the fourth, only 5·20 in. This immense rainfall, together with the unusually low state of the temperature, had, as might be expected, a most depressing and injurious effect on many of our summer birds, more especially on the Willow Wrens, Whitethroats, Chiffchaffs, and Spotted Flycatchers; so much so that I never remember hearing so few of the males singing in our plantations and hedgerows; and it was on very few occasions indeed that one heard them singing in as strong and joyous a strain as they usually do.

I did not hear a Willow Wren until the 29th of April, nine days later than in 1878, and fourteen days later than in 1877,

and the song sounded weak and poor; Spotted Flycatchers did not appear until the 30th of May, three weeks later than last year; nor were Whitethroats heard until the same date, also three weeks late.

Very few of these small birds appear to have succeeded in rearing their young, chiefly owing to the cold and excessive wet weather at the time of hatching, addling the eggs in some nests, and killing the weakly young in others. Several broods of the Spotted Flycatcher have been reared close to the house every season for some years past, but last summer I do not believe that a single brood was reared, for during the entire season their alarm-note was never heard—a call that surely gives notice that the young are hatched; and, in further proof of the failure, I watched two nests (one on an elder tree in the garden, and the other in some ivy on a part of the house) which the birds deserted, leaving addled eggs in each, after sitting longer than usual.

Willow Wrens were scarce, and I remarked no increase in their numbers as the summer advanced, missing the little family parties that are usually seen flitting about the plantations and woods. The Whitethroats also appeared unusually scarce in our hedgerows, and very silent throughout the summer. One solitary male Chiffchaff remained about the place the whole summer, but I do not think he found a mate, for I seldom saw him in the evenings near the same parts of the plantation, and if he had a nest he would of course remain in the vicinity of it at roosting-time. Golden-crested Wrens, I am sorry to say, appear to have been quite cleared out of this locality by last winter's frost, not one appearing during the summer, nor even a visitant during the autumnal migration.

Swallows are partly deserting their old breeding-places here in the cattle-houses and out-offices, for where five pairs used generally to have their nests, only a solitary pair have built for two years past; this season two broods were reared, the second leaving the nest on the 2nd of September.

Of our winter visitants Snow Buntings were pretty numerous; I saw a flock of over forty birds in November, and several smaller flocks throughout the season. Redwings appeared in much smaller numbers than usual, and Fieldfares were very scarce indeed, showing that the summer broods had not recruited

the fearful losses of the previous winter. Blackbirds and Thrushes, even more than the two previously mentioned species, show great mortality in bird life caused by the frosts of 1878-79, for in places where a score of Blackbirds might be seen in ordinary years, now only two or three—or at most half a dozen—birds are now to be met with; and as for Thrushes, two or three are all I have seen throughout the winter, but on the 2nd of this month I heard two birds singing about the place.

Our shore birds appeared in about their usual numbers, with the exception of Lapwings, which were unusually numerous, and more so than in the great Lapwing year of 1877; all through September, October, and up to the middle of November, the immense flocks assembled by day on the sands and along the shores was really wonderful, and by the 5th of November their numbers were so largely increased that when disturbed by the appearance of a Peregrine, or the discharge of a gun, and the flocks, on rising, joining together, they looked more like swarms than flocks of birds. They thus continued until nightly frosts commenced between the 15th and 20th, when they began to diminish in numbers, and by the end of the month very few remained about the sands, these also disappearing with the setting-in of the severe frost the first week of December. A curious fact connected with the habits of the Lapwings in this locality is that very few, if any, come down to the sands and shores of the estuary by day, and while the nights are dark they appear to keep altogether to their inland feeding-grounds, only assembling on the sands and shores by day, while the moon is strong and bright. My friend Captain W. K. Dover, of Keswick, who is a most successful wildfowl shooter, and well acquainted with the habits of our shore birds, assigns as the cause of this peculiar habit of the Lapwings that, during the dark nights, they are unable to obtain a sufficiency of food, and are in consequence obliged to feed during the greater part of the day also, but that during the moonlight nights they obtain such an abundance of food that they do not require any by day, and are thus enabled to come down to the sands in the mornings, and rest undisturbed all day. When on the sands, Lapwings do not stand so close together as Golden Plovers, and though so much more numerous, do not present to the punt-shooter such tempting shots, and in consequence, unless crowded up on a point of sand or shore

by the rising tide, offer no chance of a heavy shot; thirty-four is the largest number I have secured at one shot. This season I was unable to take out my punt before the 29th of October, thus losing six weeks of the best of the Lapwing shooting. However, on that day I had very fair sport, bagging seventy-six Lapwings and one Curlew; but unfortunately, through losing my best chance by a miss-fire, I lost the opportunity of making up my bag to one hundred birds.

On the 4th December, near the Island of Baunros, I got a shot at some Wild Ducks, and picked up four Mallards and a Shoveller Duck; and the following morning, near Roserk Abbey, I saw a little flock of seven or eight Shovellers. Wild Ducks and Widgeon appeared in their usual numbers; but amongst the latter I never remember to have shot so many thin and under-sized birds, many immature females being scarcely larger than Teal, and numbers of immature birds of both sexes appearing stunted and dwarfed, as if hatched very late, and half-starved for want of food when young.

I had some good days' punt-shooting in November and December, my best day's bag being twenty-three Widgeon and four Ducks, of which I got nineteen Widgeon at a shot, and several cripples, escaping into rough water, got away. However, in point of numbers my best day's shooting was on the 22nd January, when I bagged thirty Godwits, twelve Teal, four Oystercatchers, two Ducks, and one Widgeon. The Oystercatchers fell amongst the Godwits, for I should never think of shooting such useless birds except for specimens. A few Scaup Ducks were to be met with in various parts of the estuary throughout the season, and I secured two very fine adult males in splendid plumage.

Wild Swans visited us in large numbers this winter, but were generally observed in small flocks coming from a northerly direction, and all steering right on for Loughs Conn and Cullen. On several days, when out in my punt, I saw flocks of Swans passing from the north, but more pitched in the river or estuary. On one day twenty-seven passed within about one hundred yards of my punt, and so close that I could see the yellow of their bills quite distinctly; and just as they were passing the sun shone out from behind a cloud, causing their snow-white plumage to look almost dazzling. Most of these passing flocks seem to have assembled in one great herd on Lough Cullen. My friend

Captain Kirkwood, of Bartragh, when passing in the train over the railway-bridge at the Lough near Foxpid, on December 17th, saw a herd consisting of between two hundred and two hundred and fifty birds. When first observed, he thought they were the white breakers of the lake; but, as the train passed within about one hundred and fifty yards of them, to his great astonishment, he saw that they were Swans. Another friend of mine, near Ballyshannon, in Donegal Bay, counted seventy Swans in a little inlet of the bay, the week after Christmas; he said they were very noisy when feeding, and observed a large number of grey cygnets amongst the herd.

THE ORIGIN OF VARIETIES IN SALMONIDÆ.

By FRANCIS DAY, F.L.S., F.Z.S.

THERE is hardly an investigation of more interest to the biologist than the study of how local causes induce temporary, or even permanent, changes in both animals and vegetables, for the purpose of adaptation to new conditions. Among the forms thus subject to constant variation, fishes are no exception, as every fisherman and pisciculturist is aware. These modifications may be due to the quality or quantity of the water in which the finny tribes reside; to the nature of the soil over which the water passes or remains; and many other causes that it will be unnecessary to enumerate in detail. I propose offering a few short observations upon the result of keeping some *Salmonidæ*, from the time of their birth, in a state of unnatural confinement, which has induced changes that might cause a museum-naturalist to believe that the examples before him were either novelties or hybrids between different species. For some there are who consider specific rank ought to be accorded to specimens which do not coincide with the normal types. Thus, a young Salmon with a disproportionately short head and slender body has been termed *Salmo gracilis*. A Trout, owing to its proportions and the extreme muscularity of its stomach, somewhat resembling (it has been considered) the gizzard of a gallinaceous bird, first received the term of "gillaroo," as denoting merely a variety, and a few years since of *Salmo stomachicus*, under the impression that it is a distinct species.

Perhaps there are few families among fishes which can compete with the *Salmonidæ* in so rapidly developing change, and I was greatly interested in receiving the following examples from Mr. Frank Buckland, Mr. Carrington, of the Royal Westminster Aquarium, and other gentlemen who have most kindly sent me specimens, and which I exhibited at the last meeting of the Linnean Society. I wish at this time of the year to draw attention to the following facts, in order that anglers during the ensuing fishing season may be induced to carefully note any remarkable changes in form, scaling, or colours among the fishes they may be so skilful or fortunate as to capture or otherwise observe.

The first example I will allude to is that of an American Trout or Charr (*Salmo fontinalis*) introduced into this country. The specimen is nine inches long, of good condition, and having brilliant colours; it was reared by Mr. Buckland in his tanks at the Horticultural Gardens, at Kensington, from eggs received from Lake Huron. He presented some young to the authorities of the Westminster Aquarium soon after that institution was first opened, and the fish under consideration is the last which survived, having only died in October, 1879, due to having jumped out of its tank. Here there can be no question respecting the parentage of the fish—the eggs came direct from its native habitat, Lake Huron, in America; no crossing with European Trout could have occurred. It is not my purpose to detail the number of scales and fin rays in this place, but I will merely remark that they agree with what obtains in the normal *Salmo fontinalis*. A single glance at the fish, however, is sufficient to show that the head is very much elongated in proportion to the length of its body, and likewise that the very form of the subopercle has changed, being twice as long as deep, instead of square as observed in other examples reared under different conditions. I have likewise two specimens of this fish reared from eggs derived from the same source; they were turned out in Cardiganshire in 1876, and captured in the middle of the succeeding year; their entire length is similar to that of the Aquarium example, but the head is not elongated, the form of the subopercle remains unchanged. It seems to me that these facts are very suggestive; certain unnatural conditions have caused unnatural development of certain parts, and were other examples

similarly reared there exist no reasons why they should not in a like manner differ from the primitive stock. Were such forms transferred to ponds or streams they might retain such abnormal variation through succeeding generations, or return to what normally existed among their progenitors, and thus changes may be induced which ought to be regarded as mere varieties, but most probably would be looked upon as specific were specimens sent to a museum. When a history of the origin of the eggs which produced the original stock is required before any decision can be given as to what the species is, one becomes disposed to question whether species are not being unduly multiplied. It will be exceedingly interesting to watch the *Salmo fontinalis* in this country to ascertain the changes of form which occur, and especially to observe whether it does or does not interbreed with other species, for although I believe that not unfrequently examples of *Salmonidæ* are erroneously considered hybrids, there can be no question but that hybrids may and do occur. But in many instances when two of the at present determined species interbreed, and the result is a so-called hybrid that is not sterile, the possibilities are that the observer has erroneously considered as two species what were in reality merely local varieties of one.

The next fish I will allude to is a young Salmon, which was reared by Mr. Frank Buckland from eggs received from Huningen, and which were collected from Salmon captured for this purpose from below the Falls of Schaffhausen. Examining the specimens (there are four), I cannot see how any doubt can arise respecting their being the young of the true *Salmo salar*. As year after year passed by, and these fish were retained in the small amount of fresh water which was sufficient to fill the tanks in the Horticultural Gardens, the same results developed themselves which have usually attended keeping Salmon-parr in small fresh-water ponds. The body, in short, is that of the *Salmo gracilis* of Couch, and the specimens closely agree with the figures in Dr. Murie's paper, in the 'Proceedings of the Zoological Society' for 1870, upon certain irregularities in the growth of the Salmon.

Passing on to the Gillaroo Trout, the question arises, Is this a variety or a distinct species? Hunter was fully aware of the existence of this fish, and placed specimens of its stomach in his

invaluable museum. He even did more than this—he investigated the reason why these muscular stomachs existed. Having obtained a young sea-gull he gradually brought it to live entirely upon corn. Here the muscular walls of the stomach became thickened, in order to permit the bird, under the changed conditions as to food from what normally occurs, to accommodate its stomach to its new requirements. This organ had to grind up its hard corn, to do which its muscular walls became preternaturally developed. Dr. John Davy remarked that the river Trout, when feeding chiefly on incased larvæ, acquires a stomach of unusual thickness, like the Gillaroo Trout of many of the Irish lakes where they feed chiefly on shellfish. Sir Humphrey Davy, in 1827, writing about the Charr of the Leopoldstein Lake, and those of the Lake of Borguet, observed:—"I am induced to make some observations on the physical causes which by changing the habits in many generations may change the forms of fish. The Trout, when it feeds principally on fish, must be extremely active and strong, consequently from its predatory mobile habits acquires large teeth, large fleshy fins, thick skin, and great pectoral fins for turning. When it feeds on shellfish it gets the stomach of the Charr and its colours, as in the Gillaroo Trout." But if the Gillaroo Trout is a distinct species, it appears by similar reasoning that when other forms of this genus have their stomach thickened, they also should have specific rank accorded. Thompson remarked:—"The coats of the stomachs of other species of *Salmones* than *S. fario* (of which *only* the Gillaroo is set down as a variety) become muscular from the same cause. I have seen *S. ferox* from different localities with a muscular stomach, and these examples were called Gillaroo Trout by persons who distinguish them from the ordinary state of the fish, believing them to be a distinct species." If the Gillaroo is merely a variety, what will be the effect of introducing it into our English streams, as is now proposed? It will simply be that it will revert back to the Common Trout when unable to obtain a supply of shellfish. That crossing or intermingling forms from different places improves the breed of Salmon and Trout was long since pointed out, but whether the Gillaroo is one well adapted for importing may be open to question. A recent author gives as one distinguishing feature its inferior flavour; but this of course may be due to the food it indulges in. In the County

of Derry, in the River Glenlark, in the Munterloney Mountains, we are told by Thompson that the water and stones are deeply tinged with a rust colour, of which the Trout likewise partake. Their flesh is very inferior, and of a metallic flavour—so bad are they that the country people will not eat them.

Lastly, as to colour, we have the *Salmo nigripinnis*, or “Black-finned Trout.” Were this simply considered a new species from its colour some curious questions might arise. Thus, in an excellent article upon “The Brown Trout introduced into Otago,” by Mr Arthur, in the ‘Transactions of the New Zealand Institute’ for 1878, he observes that in the “Water of Leith,” when first opened for fishing, the Trout were of a fine appearance, colours being bright and the red spots large, but there is a falling off in this respect, at least as regards average-sized fish, and during spawning they all assume a darker or greyish hue. Collecting the results of an examination of various specimens, Mr. Arthur found that the number of rays varied in some of the fins, while the number of black or red spots was by no means constant, and although the best known British authors give the cœcal appendages at from thirty-three to forty-seven, he found them in Otago to be from forty-three to fifty-four, thus opening up another subject respecting Trout upon which I do not at present propose to enter. Still, I may just remark that if the number of these appendages becomes increased owing to change of climate, they must be looked upon with great suspicion as modes of designating species. Many other curious local changes are pointed out as having been induced in the transplanted fish—thus even the shape of the preopercle varies.

In conclusion I must again express a hope that a strict watch will be kept on introduced forms. I have been told that *S. fontinalis*, both in the Wandle and Cardiganshire, has interbred with the Common Trout. A very minute and exhaustive investigation in such cases would be exceedingly interesting, and such I hope will be furnished during the present year.

OCCASIONAL NOTES.

HABITS OF THE KENTISH PLOVER. — About the middle of April the Kentish Plover arrives in this country; and, as its principal breeding-places are along the south-east and south coasts of Kent, it at once repairs to these spots. Nidification, or rather propagation, begins soon after, depending a good deal on the season. The weather in May, 1878, having been warm, the young were hatched by the end of that month; last season being as much against them as the previous one was in their favour, I found eggs only half incubated by the beginning of June. The eggs, which are three in number,—not four, as is usual with other species of the genus,—are generally laid on the bare beach. Occasionally the bird will deposit them on a heap of seaweed which has been thrown up by a very high tide. The most usual place is on small pebbles through which a little grass grows. Where the eggs are so deposited, it lays its first egg on the stones without any attempt at a nest, but twists a few pieces of the surrounding grass amongst the pebbles, so that by the time the three are deposited there is a scanty apology for a nest. If put off the eggs, the bird will retire to a short distance and utter a plaintive whistle, run a few yards, then fly a little, and drop and run again. As soon, however, as the young are hatched its manner is quite different; it will then fly very close round, giving at each stroke of the wings a sharp whistle, then drop suddenly, as if shot, crouch very close, expand its wings and tail, and drag itself along, then suddenly take wing again, and go through the same motions till the intruder is at a safe distance. The call-note is a soft whistle quickly repeated four or five times. The young, which run as soon as they are hatched, keep close to the parent birds till well able to shift for themselves. The food of this species consists of insects and small worms, which it picks up at the water's edge and on the beach, when its form and manner much resemble the Sanderling, the head being drawn in, the body nearly horizontal, and the thighs concealed among the feathers of the under plumage. There is a species of spider which has hitherto baffled my attempts at capture on account of the rapidity with which it travels among the stones, and which is found in great abundance on the beach, and as the bird is often seen running very nimbly over the stones and occasionally darting its head down it may fairly be presumed that this insect constitutes a good deal of its food. If the eggs are approached, but not too nearly, the bird may be seen to run among the grasses, and every now and then raise itself on its legs and stretch its neck to see and not be seen. It possesses great powers of ventriloquism. I have stood still and tried for some minutes to discover one which was in an entirely different place to what I had supposed from

its note. Their favourite place for exercising this is on a moderate-sized stone, where they will stand and whistle for many minutes at a time. I need not describe either the bird or its eggs, as they have so often been treated of. I would only advise those who wish to see it to visit the collection of the late Dr. Plomley, which is admirably arranged and preserved in the Museum at Dover.—H. A. DOMBRAIN (Westwell Vicarage, Ashford, Kent).

BEWICK'S SWAN IN NORFOLK.—On the 18th February I was marking trees at Hempstead, in Norfolk, where there are some large ponds, one of which is known as the "Old Decoy," which is strictly preserved, and where during the past autumn there has been an average of sixty or seventy Wild Ducks. The Ducks were all gone, as the men felling the trees had driven them away, and only an occasional Mallard comes back to witness the desolation of his quondam abode. I noticed two Swans on the pond, and the keeper remarked that they had been there about four or five days, and had strayed away from a gentleman's place near at hand. I therefore paid no particular attention to them. Indeed they might have escaped notice if they had not attracted our attention by their musical cries, which were so loud as to induce us to leave the trees and go towards them. They had left off swimming, and were standing in the shallow water, and we saw that their beaks were black. The next instant they slowly rose into the air, and the effect of these snow-white birds against the dark background of Scotch firs was very fine. Owing, I suppose, to the difficulty of rising in a confined place, for the pond is surrounded by woods, one of them struck against a Scotch fir and fell to the earth. We ran to get him, but he was not much hurt and made off as hard as he could through the wood—I after him. When within ten yards I saw it was a Bewick's Swan, and a very fine one, too. A regular chase ensued, for the bird had not lost the use of its wings; but I caught it at last, and then discovered that it had struck its head, probably against one of the boughs, and put out an eye. Meanwhile the other Swan flew round, uttering clamorous trumpet-calls. I sent off the keeper for a gun, while the woodman and I spread out the dead bird, and endeavoured, by imitating the calls of its mate, to keep it from flying away. This was successful for about ten minutes, when we had the mortification of seeing it disappear; but a quarter of an hour afterwards I found it on one of the other ponds. As the keeper had some way to go, I had ample leisure to watch it attentively. It certainly did not seem to miss its mate, for it went on feeding busily, its whole head and neck being as often under the water as above. On the same piece of water we keep a pair of Polish Swans, and I had a good opportunity of comparing their carriage with that of the Bewick's Swan. There was very little difference, except that the latter looked no bigger than a goose beside them. Perhaps the Bewick's Swan's neck was a trifle less arched; but in every position it

was quite different from the straight neck of the Whooper. After a long wait the keeper returned with the wished-for guns, and a council of war having been held, he hid up in a sluice at the bottom of the pond while I made a wide *détour*, and with much careful stooping and stalking reached an ambush in the reeds which I had fixed on as my place for a good shot, and the woodman went round to the further side in order to drive the Swan to us. Eventually the pair of Polish Swans drove it towards my ambush, and I shot it. These two birds, though in perfect condition, only weighed nine pounds and three-quarters each, but were in splendid feather—pure white, with a tinge of rufous on the forehead. They measured five feet ten inches from tip to tip of wing, and the base of the bill when fresh was a lemon-yellow, but at a distance the whole appeared black. There was a sexual distinction in the beak, for they proved on dissection to be male and female, which is worth mentioning. In the female the yellow did not extend over the ridge of the upper mandible, which ridge was black, slightly mottled with yellow, the same part in the cock bird being entirely yellow. The gizzard of the latter contained small stones, “silt,” pond-grass, water-insects’ legs, and the tail of a small fish, while that of his partner appeared to contain only pond-grass. Mr. Gunn tells me that about the same date a Bewick’s Swan was shot at Saxmundham, and sent him to be stuffed, and he heard on good authority of two more killed at Yarmouth.—J. H. GURNEY, JUN. (Northrepps, Norwich).

IMMIGRATION OF THE LONG-EARED OWL.—Respecting the immigration of the Long-eared Owl (p. 106), it is perhaps worthy of mention that these birds have during this last winter appeared in very unusual numbers in Sussex. I saw a few days since at Pratt’s and Swaysland’s, the birdstuffers in Brighton, a considerable number, each of those persons having received above a dozen specimens, of which the first was obtained on the 24th November, 1879, and the last a few days ago (March 4th). Nearly all of these were obtained amongst the furze on the South Downs, attracted, I suppose, by the mice. This bird, though generally diffused about the wooded portions of the county, is by no means abundant, and although it has been mentioned as an autumnal immigrant to the eastern counties, I have never heard till the last few months of so many having been observed in so short a space of time in Sussex.—WILLIAM BORRER (Cowfold, Sussex).

UNUSUAL ABUNDANCE OF THE GREEN WOODPECKER IN SOMERSETSHIRE.—A Taunton birdstuffer assured me that he has had upwards of fifty Green Woodpeckers brought to him for preservation since Christmas! This wholesale destruction of an inoffensive and beautiful bird is much to be regretted. Owing to the scarcity of the migratory Thrushes and most other small birds, the guns of holiday hedge-poppers have had to be levelled

at other game, and the Woodpeckers, unable to screen themselves in the leafless trees, have fallen victims.—MURRAY A. MATHEW (Bishop's Lydeard, Taunton).

[Does not the fact of so large a number of Woodpeckers being found in one district seem to indicate a migratory movement towards the south-west on the part of this species? There is reason to suppose that the Greater Spotted Woodpecker is to a certain extent migratory. (See Yarrell, 3rd ed., vol. ii., p. 155, and Saxby's 'Birds of Shetland,' p. 138). Possibly this is the case also with the Green Woodpecker. The appearance of this bird of late years in Cornwall, where it was formerly unknown (Rodd, Zool. 1876, p. 4796) is very remarkable, and seems to bear upon the question at issue.—ED.]

BREEDING OF THE TUFTED DUCK IN NOTTINGHAMSHIRE.—In the summer of 1878 a nest of the Tufted Duck was mown out not far from the decoy at Park Hall, near Mansfield. The eggs were taken at once to the housekeeper (a clever hand at rearing poultry of all kinds), who hatched them out under a hen, and succeeded in rearing seven, feeding them the same as common ducks, worms also being given them in a tin of water to dive for. In the autumn, when full grown, the ducks left the yard and joined the wild ones of their own species in the decoy, numbers of which frequent the pond, and were lost sight of, the housekeeper being congratulated on her success in rearing such tender birds, and no more was thought about them. However, one day in June last a Tufted Duck was seen by some of the servants at Park Hall to fly over and settle in the yard at the back of the house, and try to get in at the kitchen-door, and also the hen-coops. On the housekeeper being told she went out, and giving the same call she had been in the habit of using when feeding the young ducks the previous year, it immediately ran to her and followed her into the kitchen, and ate out of a saucer and from her hand. This it did for several days, until one morning it appeared followed by eleven young ones, all of which, after being fed, were placed in a coop, but having got so wet by being dragged through the long wet grass—the lake being fully a quarter of a mile from the house—they all died. This is the first instance in which I have heard of the Tufted Duck, of its own free will leaving its wilder brethren and bringing its young to the poultry yard to be fed; but no doubt the bird was influenced by kindly recollections of good treatment the year before.—J. WHITAKER (Rainworth Lodge, near Mansfield).

PEREGRINE FALCON IN HAMPSHIRE.—On November 6th I saw a bird of this species, which I think is worthy of remark. It was shot a day or two previously near the river, where it had been observed for a week or ten days, and is said to have killed a large number of wildfowl during that period. It was a female, and, unlike the condition of many of the

Falconidæ, it was very fat when the skin was taken off for preservation. It weighed exactly three pounds two ounces, which to me is an extraordinary weight; and the bulk of its body generally, and especially about the breast, indicated that it had been in good quarters of late, and must have been a most powerful enemy amongst its feathered kin, upon which it thrived so well. It measured twenty inches and a half from beak to tail; I did not measure its expanse of wing, but that undoubtedly was in proportion to the length of the bird. Altogether it seemed to me the muscular and stout-limbed creature, especially in the legs and claws, must have been a giantess among her race, and if tamed and well trained would have been the pride of a falconer's heart.—G. B. CORBIN (Ringwood, Hants).

PEREGRINE FALCON AND CURLEW IN OXFORDSHIRE.—On January 17th I purchased a male Peregrine Falcon, which had been shot that morning close to Banbury. As far as I could see, the bird showed no sign of confinement, except that it was very fat—this being very unusual in the generality of the *Falconidæ* killed round here. A Curlew was shot, a few miles off, in the autumn. Fieldfares have been very scarce, but Redwings fairly numerous.—O. V. APLIN (Bodicote, near Banbury).

SUPPOSED BREEDING OF THE SCAUP IN IRELAND.—In October last I received the following from my friend, the Rev. George Robinson, residing near Lough Neagh:—"My sons were out on the lake the other day, and had excellent sport. Among other birds they got a Scaup in immature plumage, without quill-feathers in the wings, and which must have been bred on the lake." Thompson, in his 'Birds of Ireland,' makes the following remark:—"Montagu's remark (in his Supplement) that the Scaup is rarely observed upon fresh-water is applicable to the North of Ireland. It has not been brought to me from Lough Neagh, nor have I known it to be killed on any inland localities, though no doubt such rarely does occur. A small flock, among which were several adult males, was observed in Ballydrain Lake on the 2nd of April, 1848. It is said occasionally to visit Lough Beg, in Kerry, as well as the Pochard. I was told by the chief hawker of wildfowl in Dublin, in December, 1849, that he never received it from inland waters, though nearly all the wildfowl he disposes of are sent thence."—J. GATCOMBE (Durnford Street, Stonehouse).

ON THE NESTING OF THE COMMON WREN.—Peculiar as are many of the situations in which the nest of this species is placed, the birds here last year (May) seem to have struck out a fresh line for themselves altogether—two nests being built in old nests of the Chimney Swallow. One Swallow's nest was in the apex of the roof of an outhouse used as kennels, and the Wren built up the Swallow's nest with *green* moss right to the top, leaving the hole just above the edge of the latter's old nest. This the Wren

plentifully lined with feathers, but no eggs were laid. The other Swallow's nest was in a somewhat similar situation, except that it was in an outhouse with a loft overhead, and consequently when the Wren had built up with moss all the front and sides of the Swallow's nest, the top of its own nest was flat—the one before mentioned being in the form of a sharp peak. This nest had no eggs, and no farther lining than the few feathers left in by the Swallow. It seems strange that the Wrens should have chosen the above situations when there were hay-ricks and beech-hedges in the immediate vicinity.—C. BYGRAVE WHARTON (Hounslow, Hants).

ROOKS IN THE TEMPLE GARDENS.—Since the remarks on the origin of the Temple Rookery were published (Zool. 1878, pp. 196, 443), I have come across a passage in Aubrey's 'Natural History of Wiltshire' (p. 64), which, although very brief, distinctly indicates that the Rookery in question is of much older date than is to be inferred from the work previously quoted. Aubrey's words are:—" 'Tis certain that the rookes of the Inner Temple did not build their nests in the garden to breed in the spring before the plague, 1665; but in the spring following they did." What, then, becomes of the pretty story of their having been introduced by Sir William Northey in the reign of Queen Anne?—J. E. HARTING.

STOCK DOVES BREEDING IN MAGPIES' NESTS.—It is not, I believe, generally known that, in addition to the many curious sites fixed on by the Stock Dove for nesting, it will occasionally resort to a deserted nest of the Magpie. I am able to enumerate at least four distinct instances of this, two of which have come under my own observation. The first I have already recorded in 'The Zoologist' (1876, p. 4875), but "Wood Pigeon" was by some mistake printed for "Stock Dove," and the second occurred last August, when I shot the Stock Dove as it flew out of the nest, so there can be no doubt as to the species. For the other two instances I am indebted to an oologist in Warwickshire, who discovered their nests when in search of eggs for his collection.—C. MATTHEW PRIOR (The Avenue, Bedford).

GREAT SKUA AT BRIGHTON.—In the middle of February last I saw a Great Skua flying over the sea near the Chain Pier at Brighton. It looked very black on the wing and flew heavily, as if fatigued. A few days afterwards one was shot near Brighton, and taken to Swaysland for preservation. This bird was unusually dark in colour, and, as this species has not been very often obtained on the Sussex coast, was probably the one that I saw.—W. BORRER (Cowfold, Sussex).

ROUGH-LEGGED BUZZARDS IN WILTSHIRE.—A Rough-legged Buzzard was killed at Ferne, near Salisbury, on January 1st; and a fortnight previously one at Avon Castle, about four miles from here.—EDWARD HART (Christchurch, Hants).

MANX SHEARWATER INLAND.—Early in September last, as some miners were proceeding to work one morning at Lofthouse, near Wakefield, they observed a bird endeavouring to flutter over a wall into an adjoining plantation. They easily captured it, and kept it alive for some days, when it was killed and sent to me for identification and preservation. I at first took it to be the rarer Dusky Petrel; but your opinion, as you have seen the bird, induces me to change my view. As it was found at so great a distance from the sea, the circumstance, as above narrated, may be worth recording.—J. SPURLING (42, Northgate, Wakefield).

SINGULAR DEATH OF A BLUE TITMOUSE.—A curious circumstance came under my notice the other day. While walking along a hedgeside in my meadow, I observed a Blue Tit dangling from a twig; it had got its head through a noose of hair which was entangled in the bushes, and had fluttered about till it had twisted the hair quite tight. I saw it some considerable distance off struggling to get free, but by the time I got to the place it was very nearly dead, and expired shortly afterwards.—J. KING (Langford Road, Biggleswade).

GREY SHRIKE, RAVEN, AND GOOSANDER IN THE WEST OF ENGLAND.—It may interest some of your readers to note the occurrence in the West of England of the following birds, which have been sent to me for preservation:—A Great Grey Shrike, obtained near Malvern; an adult male Raven, shot near Winchcombe, Gloucestershire; and an adult male Goosander, killed at Hinton Blewitt, near Bristol.—H. WHITE (The Museum, Cheltenham).

CHIFFCHAFF REMAINING IN ENGLAND DURING THE WINTER.—A Chiffchaff was shot at Barton Grange, near Taunton, about the commencement of the present year, and was in very good condition. Strange that it should have remained here throughout such an unusually severe winter.—MURRAY A. MATHEW (Bishop's Lydeard, Taunton).

THE BIRDS OF YORKSHIRE.—In the 'Transactions of the Yorkshire Naturalists' Union,' Mr. W. Eagle Clarke, of Leeds, has commenced a Catalogue of the Birds of Yorkshire, in which full details are given concerning the occurrence of the rarer species. Should any of our readers be able to furnish Mr. Clarke with information likely to be useful to him, we make no doubt he will be pleased to receive and acknowledge it. His address is 5, East View, Hyde Park, Leeds.

GREAT BUSTARD IN ESSEX: CORRECTION OF AN ERROR.—In 'The Zoologist' for January last (p. 26) Mr. Smoothy reports a Great Bustard shot by Mr. A. Pertwee at Woodham Ferrers, near Hull Bridge, on the 5th December last. In a succeeding number (p. 110) Mr. Travis refers to a Great Bustard "procured by Mr. Porter near Chelmsford" also on

December 5th. From these two statements it might be inferred that two Great Bustards had been recently obtained in Essex. It appears, however, from the report of a paper read by Mr. R. M. Christy, of Chignal, near Chelmsford, at the first meeting of the recently-formed Essex Naturalists' Field Club, that this is not the case. Both the communications above mentioned refer to one and the same bird, which was shot on December 5th by Mr. Albert Pertwee, of Woodham Ferrers, at Hull Bridge, which is some ten or twelve miles from Chelmsford.—J. E. HARTING.

ERRATUM.—Tain is not in Sutherlandshire (p. 111, line 27); it is the county town of Ross-shire.

BANKS' OAR-FISH NEAR WHITBY.—Mr. C. W. Elliott, in 'The Field' of the 7th February last, announced the capture, at Staithes, near Whitby, of a singular fish, which was at first supposed to be the Vaagmaer, or Deal-fish, *Trachypterus arcticus*, but which, from the description given, is doubtless Banks' Oar-fish, *Regalicus Banksii*. Mr. E. W. Holdsworth, writing in a subsequent number of 'The Field,' remarks:—"The characters given of the specimen by Mr. Elliott all agree with those of the Oar-fish, and its dimensions, with their peculiar proportions, are found in no other species met with on our coast. Dr. Günther, in his 'Catalogue of Fishes,' refers to fourteen examples of this species, or which appear to belong to it; for the record of captures, extending from 1759 to 1852, is in many cases very imperfect in details of specific character, in which the length ranges from eight to eighteen feet. One specimen, said to have been caught in 1845, is stated to have been twenty-four feet long; but there is some reasonable doubt about the accuracy of the statement. Perfect specimens are rarely obtained, and restorations of form and length are generally open to question. The most complete and trustworthy description of the species was given by Hancock, in the 'Annals and Magazine of Natural History' (1849, iv., p. 1), from a specimen obtained on the Northumberland coast, and is reproduced in the third edition of Yarrell's 'British Fishes,' the figure and description of this fish in the first edition of that work being very imperfect, owing to the scanty materials then within reach. Among the peculiarities of this Oar-fish may be mentioned the curious prolongation of the first twelve spines or rays of the dorsal fin, extending to a length of more than twelve inches in the anterior six or seven, and diminishing in length as they proceed backwards. It appears that these rays are very liable to be broken off; but it would be interesting to know whether Mr. Elliott observed anything like them. The ventral fins, described by him as two bone-like protuberances, have here the character so often noticed; but really they are only the remains of two long spines, said by

some persons to be bifurcate in their perfect condition. This is a point that wants clearing up. The tail is also somewhat peculiar, being obliquely truncate, and without any distinct terminal fin. The specimen which came under the notice of Mr. Hancock, and was described by him and Dr. Embleton, was also examined by Yarrell and Couch whilst it was being exhibited in London, and the latter author prepared from it his figure of the species, which was afterwards published in the second volume of his work on 'British Fishes.' The illustration of the Oar-fish in the third edition of Yarrell's work was also made from this specimen. Nothing appears to be known of the habits of this curious fish; but, from the rarity of its capture, it is probably a deep-water species. It has not been hitherto found except on the British coast, four specimens having been obtained in Cornwall, and the others on the eastern side of England and Scotland. Couch mentions that three or four specimens had been captured since the one he examined in 1849, and the largest of them, taken near Wick, measured fifteen feet and a half in length. Five other species of the genus are included in Dr. Günther's Catalogue as found in the seas of Europe, the Atlantic, Indian and New Zealand seas. There is a good deal, however, yet to be learned about them all, and there is only an imperfect specimen of one species in the British Museum." The first example on record in England is said to have been obtained at Whitby in January, 1759. It is curious that the latest which has occurred, *viz.*, that now under notice, should have been procured in the same locality.—J. E. HARTING.

THE HOATING ON THE SUSSEX COAST.—During the present month of March an example of this fish, *Coregonus oxyrhynchus*, was sent by Mr. Byerley, of Chichester, to Mr. Buckland, who kindly handed it over to me. As it was perfectly fresh, it may be accepted without doubt as a local capture from off the Sussex coast. The first British specimen of this fish was recorded by me in the 'Proceedings of the Zoological Society' for May 15th, 1877; two examples were received from Lincolnshire as "Grayling." I suspect this is the fish recorded by Ruttý, in his 'Natural History of the County of Dublin' (1772), wherein he observes:—"Thymallus. The Grayling or UMBER. With us it is a sea-fish, and less than Willughby's, which is a river fish." The Hoating is found along the coasts of Holland, Germany, and Denmark, entering rivers; therefore stragglers to Great Britain probably are not rare. The true Grayling is not an Irish fish, consequently Ruttý must have been in error as to his species, while a *Coregonus* such as the Hoating may have been mistaken for a *Thymallus*.—FRANCIS DAY (Kenilworth House, Pittville, Cheltenham).

TROUT IN THE THAMES.—On the 12th February last two Trout were taken in the Thames between Hungerford and Waterloo Bridges, the

larger weighing $14\frac{1}{2}$ oz. and measuring $13\frac{1}{2}$ inches, and the smaller weighing $5\frac{3}{4}$ oz. and measuring $9\frac{3}{4}$ inches. Mr. Buckland, who examined them, reports that they were young Bull Trout. The stomach and throat of the largest of these fish was as full as it could be of Whitebait, upon which it had been feeding. It was fat to an extraordinary degree, the pylories being so covered with fat that it was with difficulty they could be counted. Both fish were silvery, with fins a faint yellow, tail square, and on its edge a darker line; the adipose fin tipped with red; the body covered with spots, descending a long way below the lateral line. In life these spots must have been of a dark brown colour. Mr. Buckland was puzzled to know whence these fish could have come, but believed them to be truly wild, and not artificially bred. For some years past he has been in the habit of receiving specimens of this kind of Trout from the mouth of the Thames about the time that the Whitebait make their appearance, and he has no doubt that they follow the shoals to feed upon these small fry. The man who caught them was fishing for Flounders, and it is satisfactory to think that the water is now sufficiently purified to enable not only Flounders but Salmonoids to live in it. A considerable portion of the London sewage being now taken down into the estuary by the main-drainage works, the mid-portion of the river is said to be comparatively clear.—J. E. HARTING.

GREENLAND BULLHEAD AT BRIGHTON AND SOUTHEND.—According to Couch, this species, *Cottus grœnlandicus*, has only once been recorded from any part of the British seas, and then from the coast of Kerry. During the past month I have received three living specimens, about six inches in length, captured between Shoreham and Brighton: and several other specimens arrived last night (March 16th) of about the same size, taken in the Whitebait nets off Southend, in the estuary of the Thames. The remarkable part of this occurrence is that I have from time to time during the last four years received large numbers of other species of the genus *Cottus* which inhabit our coasts, but never before saw examples of the Greenland Bullhead. I forwarded three examples to my friend Mr. Francis Day, who has compared them with Greenland specimens from the Leyden Museum, and thus kindly confirmed my identification. Yarrell, in his 'Natural History of the Fishes of Britain,' makes no mention of this species, but in the Supplement reference is made to the Kerry specimens, and the species is there well figured. Dr. Günther, in his Museum Catalogue, simply gives Arctic seas of America as the habitat, but I believe it is also taken in the extreme north and west of Europe. The Greenland Bullhead grows, I understand, to a large size in the waters east of Greenland, and is there esteemed as an article of food. This species might easily, in its younger stages, be passed amongst a batch of Bullheads (*Cottus scorpius*) or Father-lashers (*Cottus bubalis*), being superficially like the latter. A second look,

however, will at once separate them, there being below the lateral line some beautiful white spots, edged with rich carmine and brown. In some specimens these spots are white only, and without the rich colouring, but this difference may be sexual.—JOHN T. CARRINGTON (Royal Aquarium, Westminster).

GREENLAND BULLHEAD AT BRIGHTON.—Mr. Carrington has recently been good enough to send me three examples of this fish captured during the month of February this year at Brighton, two being five inches and one six inches and a half in length. Couch observes that “no more than two instances are known of its having been taken in the British Islands, and both of these occurred in Ireland.” It is a fish which was long confounded with the common Father-lasher. Having received two Greenland examples from the Leyden Museum, I have been able to compare them carefully with the Brighton specimens, and, without entering into details, I may observe that they agree in every essential respect, and those examples which are marked with large round white spots are said to be males. All the three examples alluded to had these round white spots, and all were males. It is, however, worth recording that such large and brilliantly-coloured examples have been taken so far south as Brighton.—FRANCIS DAY.

DEATH OF MR. BELL, OF SELBORNE.—To every reader of ‘The Zoologist’ the name of Thomas Bell must be a “household word”; for who has not, many a time and oft, had occasion to consult the pages of ‘British Quadrupeds’ and ‘British Reptiles,’ or turn to the volume on ‘Stalk-eyed Crustacea’ in order to identify some doubtful species picked up in the course of a sea-side ramble? Who, again, has not read with pleasure the latest edition of ‘The Natural History of Selborne,’ enriched as it is with the critical notes of him who has just passed peacefully away in the very house in which Gilbert White lived and died? The announcement of Mr. Bell’s death will, we feel sure, evoke amongst naturalists a universal expression of regret; for even those who did not know him personally will acknowledge a feeling of indebtedness to one who, through his published works, has been the means of imparting so much valuable knowledge in different branches of Zoology.

Mr. Bell died at Selborne on the 13th March, at the advanced age of eighty-seven. Since the year 1860 he cannot be said to have taken any active part in the proceedings of the scientific world, for his reputation will rest upon the excellent work which he accomplished prior to that date. Nevertheless in his retirement at Selborne he was by no means idle, for he occupied himself in the preparation of a second edition of his ‘British

Quadrupeds,' which appeared in 1874, and in collecting materials for a new edition of Gilbert White's works, to which we have already referred, and which was published in two volumes in 1877. In his leisure moments, too, he found time to contribute occasionally to the pages of 'The Zoologist' the result of his out-door observations on various topics of interest to naturalists, which will be fresh in the recollection of our readers.

The position which Mr. Bell occupied in the scientific world as former Secretary of the Royal Society, President of the Linnean Society, and Professor of Zoology at King's College, London, furnishes an example of the eminence which may be attained by a zealous worker in the cause of Zoology, having always at heart the interests of others rather than his own, and the advancement of a science of which he proved so able an exponent. Few amongst his disciples have greater cause to be grateful for his encouragement and assistance than the Editor of this Journal, who will ever look back with mingled feelings of pleasure and regret to bright days passed at Selborne in the society of his kind-hearted mentor and friend.

PROCEEDINGS OF SCIENTIFIC SOCIETIES.

LINNEAN SOCIETY OF LONDON.

February 19, 1880.—WILLIAM CARRUTHERS, F.R.S., Vice-Président, in the chair.

Mr. Edwin Simpson Baikie was elected a Fellow of the Society.

Mr. James Britten exhibited some specimens of Ants, a species allied to, if not identical with, *Pheidole javana*, Mayr. These insects, it seems, bore tunnels and galleries ramifying through the under-ground stems of plants of the genus *Myrmecodia*, which grow in the Eastern Archipelago. The Italian savant, Beccari, who has studied the living *Myrmecodia* in its native localities, asserts that the presence of the ants is essential to the plant's existence; for unless the young plants are attacked by the ants they soon perish. As illustrating this, Mr. Britten brought forward a series of examples of young and old *Myrmecodia celimata* and *M. glabra*, which had recently been sent home from Borneo by Mr. H. O. Forbes, and certainly all of these manifested the ant's industry. This curious abode, when seen in longitudinal section of the swollen underground stem, resembles in some respects the chambered tunnels of the White Ant, *Termites*.

A different example, but equally curious, was that brought forward by Dr. Maxwell Masters, viz., a pitcher-plant (*Nepenthes bicalcarata*), from Borneo. It seems these peculiar pitchers, when in the growing condition in the forest, are perfect traps to creeping insects, in consequence

of the incurved spinous ridges round the throat of the pitcher. To take advantage of the store, a certain species of black ant ingeniously perforates the stalk, and making a passage upwards provides safe inroad and exit to get at the sumptuous fare of dead and decaying insects contained within the pitcher. Moreover, the remarkable Lemuroid (*Tarsius spectrum*) likewise visits the pitcher-plant for the sake of the entrapped insects. These it can easily obtain from the *Nepenthes Rafflesiana*, but not so from the above-mentioned *N. bicalcarata*, where the sharp spurs severely prick the animal if it dares to peep in or trifle with the armed umbel.—J. MURIE.

ZOOLOGICAL SOCIETY OF LONDON.

February 17, 1880.—ARTHUR GROTE, Esq., Vice-President, in the chair.

The Secretary read a report on the additions that had been made to the Society's Menagerie during the month of January, and called special attention to a Japanese Hawk-eagle (*Spizactus orientalis*), from Japan, presented by Mr. Harry Pryer, of Yokohama; and to two Blue-eyed Cockatoos (*Cacatua ophthalmica*), presented by the Rev. George Brown, of Duke of York Island.

Mr. Selater exhibited and made remarks on a skin of *Colobus palliatus*, Peters, from the Zanzibar coast, and pointed out its apparent identity with his *Colobus angolensis*.

A letter was read from Mr. W. B. Pryer, of Elopura, Bay of Sandakan, Northern Borneo, relating to certain birds and quadrupeds of that country.

Prof. Flower exhibited and made remarks on the skull of a two-horned Rhinoceros (*Rhinoceros sumatrensis*), which had been obtained in Sandakan, Northern Borneo, by Mr. W. B. Pryer.

Mr. Selater exhibited and made remarks on the drawing of an apparently new Parrot of the genus *Chrysotis*, now living in the Society's Gardens, which he proposed to call *Chrysotis caligena*, after Mr. Lawrence's MS.

Prof. Flower read a paper on the anatomy of the Bush-dog (*Icticyon venaticus*), based on a specimen lately living in the Society's Gardens.

Mr. W. A. Forbes read a paper on some points in the structure of *Nasiterna*, bearing on its affinities.

A communication was read from Mr. Geoffrey Nevill, containing a paper on the land-shells, extinct and living, of the neighbourhood of Mentone (Alpes Maritimes), with descriptions of a new genus and of several new species.

Mr. W. Toetmeier read a note on the synonymy of the Kaffir Crane, commonly called *Balearica regulorum* (Licht.).

Lord Walsingham read a paper on some new or little-known species of *Tineidæ* from North America.

March 2, 1880.—Professor ST. GEORGE MIVART, Esq., F.R.S., Vice-President, in the chair.

Mr. W. A. Forbes read the first of a series of papers on the anatomy of Passerine Birds. The present communication related to the structure of the stomach in the genus *Euphonia*, and in other allied genera of the family *Tanagridæ*.

Mr. A. G. Butler read a paper on some new and little-known species of butterflies collected in India by Dr. Watt, of the Calcutta University.

Messrs. Sclater and Salvin read a paper on the birds collected by Mr. Clarence Buckley in Eastern Ecuador. During his recent residence at Sarayacu, on the Upper Rio Pastaza, Mr. Buckley had formed a very large collection of birds, which had been carefully examined by the authors, and of which they hoped to be able to give a general account on a future occasion. On the present occasion they described only the eighteen species which they considered to be new to science.

Mr. Howard Saunders read a paper containing a descriptive list of the Sea-birds obtained by Lord Lindsay during his voyage in the yacht 'Venus' to Mauritius. The species were eighteen in number, and mainly belonged to the families *Fregatidæ*, *Pelecanidæ*, *Phætontidæ*, *Laridæ*, and *Procellariidæ*.

Mr. M. Jacoby communicated a paper containing descriptions of new species of Phytophagous Coleoptera collected in South America.

Mr. A. G. Butler read a paper on some new species of Orthoptera of the genus *Anostostoma*, collected by Mr. Kingdon at Antananarivo, Madagascar.

A communication was read from Col. R. H. Beddome, containing the description of a new species of snake, obtained in Malabar, proposed to be called *Plectrurus aureus*.

Messrs. Godman and Distant read a paper containing the descriptions of five new species of African butterflies.—P. L. SCLATER, *Secretary*.

EPPING FOREST AND COUNTY OF ESSEX NATURALISTS' FIELD CLUB.

The first ordinary meeting of this Society was held at Buckhurst Hill, Essex, on February 28th, the President, Mr. Raphael Meldola, F.R.A.S., F.C.S., presiding. Nearly seventy members were present.

The minutes of the foundation meeting having been read and confirmed, the President delivered an inaugural address on the objects and work of the Club. In the course of his remarks he observed that in forming the Epping Forest Club their primary object was the furtherance of science—the annual addition of something, however humble, to the general stock of human knowledge. They already included in their ranks many members well versed in special branches of Natural History, to whom they should look for

assistance in their respective subjects; and he was glad also to be able to announce that many eminent specialists outside their own Society had promised their valuable aid in identifying specimens or in other ways promoting the object of the Club. Their chief objects, the advancement of natural science, would be best effected by the publication of original papers, notes, and discussions; but they must likewise bear in mind that science would also be indirectly promoted by mutual intercourse and instruction, and, above all, by fostering and educating the scientific faculty in their younger members. In the course of time, as their Society continued to increase,—as it surely would if it only fulfilled the promises of its early youth,—they should hope to establish permanent collections in a museum, and any contributions of specimens to form the nucleus of such a public collection would at any time be welcome. He would suggest that a “Museum Fund” be started for that purpose. He pointed out the obvious advantages of having in one building their collections, library and meeting room, and suggested that it would be best for the members to endeavour to furnish the museum, as far as possible, from specimens collected by themselves in the county. He hoped that by having specimens illustrating the life-histories of the species and their structure and anatomy, in time they might possess a collection of educational and technical value that would not be unworthy of a Field Club which already included members of many of the most influential families in the county, and which might ultimately become of scientific use to specialists outside their own ranks. Mr. Meldola then gave a sketch of the geological features of the county, and the influence of the glacial epoch on the conformation of Britain. He thought that a large field of labour lay before their geological members in attempting to determine the relative ages of the various drift-deposits of their own district, and thus contributing their mite towards erecting the structure of that noble science which regarded “ages as its days.” A vote of thanks was accorded to the President for his “address,” coupled with a resolution to print it for the members.

The Secretary read a paper communicated by Mr. R. M. Christy, of Chignal, near Chelmsford, “On the Occurrence of the Great Bustard (*Otisc tarda*, Linn.) and the Rough-legged Buzzard (*Buteo lagopus*) near Chelmsford, during the Winter of 1879.” The specimen of the Great Bustard was shot by Mr. Albert Pertwee, of Woodham Ferrers, soon after daybreak on December 5th, at Hull Bridge, in that parish. The author described the specimen, which is a young male, and weighed ten pounds. Its total length was about three feet nine inches, and the expanse of wing exceeded seven feet. He also gave some interesting particulars as to the former history of this extinct bird—that is, extinct in the British Isles. So far as he knew there was no definite and authentic record of the occurrence of the Great Bustard in Essex; but Mr. Smooty recollects being told many

years ago by a very aged farm labourer that he had once known of a nest near Chelmsford; and there is a hamlet called Bustard Green, not far from Dunmow. Yarrell, too, mentions an advertisement in the 'Spectator' for 1712, where an estate was to be let at Heydon, near Saffron Walden, with "woods of large timber where is all game, even to the Pheasant and Bustard." He considered that in all probability the Bustard had not been a very rare bird in Essex; but he did not think that it had ever been abundant, for the county has not—nor has it had for a very long time past—those large open and uncultivated tracts which form the strongholds of the species. The Essex specimen (exhibited at the meeting) was purchased by Mr. C. Smoothy, of Bexfields, Galleywood, near Chelmsford, in whose collection it is now preserved. The Rough-legged Bazzard was shot by Mr. David Christy, at Patching Hall, near Chelmsford, on December 19th, 1879. It was a female, in very good condition.

Mr. E. A. Fitch said that he had heard of two other specimens of the Great Bustard in Essex this winter—one at Mauntingtree and one at Maldon. He also observed that the local papers had reported the specimen described by Mr. Christy as occurring at Chelmsford. This was incorrect, as Hull Bridge was ten or twelve miles from that town.

Mr. N. F. Robarts exhibited a molar tooth of *Elephas primigenius* from brick-earth at Lea Valley, Upper Clapton, and specimens of granites and lavas used for road-mending by the Woodford Local Board.

Mr. James English exhibited various species of Fungi and Lichens from Epping Forest, with the natural forms wonderfully preserved, and many rare species of Lepidoptera taken in the forest during the last thirty or forty years.

Mr. Gould exhibited drawings showing the differences between the Viper and the common Ringed Snake.

Various living organisms under microscopes were exhibited by Messrs. F. Oxley, W. Forster, R. Letchford, and H. Crouch.

NOTICES OF NEW BOOKS.

The Crayfish; an Introduction to the Study of Zoology. By T. H. HUXLEY, F.R.S. 8vo. London: Kegan Paul & Co. 1880.

IN this, the latest addition to Messrs. Kegan Paul's "International Scientific Series," Prof. Huxley has set himself the accomplishment of no easy task—*viz.*, to show, as we learn from his preface, "how the careful study of one of the commonest and

most insignificant of animals leads us, step by step, from everyday knowledge to the widest generalizations and the most difficult problems of Zoology, and indeed of biological science in general." The work, then, although entitled 'An Introduction to the Study of Zoology,' is to be regarded not so much as a graphic and popularly written exposition of the leading outlines of biological science, as a hand-book for those who are desirous, "crayfish in hand," of gaining for themselves a practical acquaintance with the subject from personal observation and experiment.

After some preliminary remarks on the relation of "common knowledge" to science, and a discussion of the derivation of the term "crayfish," Professor Huxley, in his introductory chapter, sets before the reader such points in the structure, growth and development of the animal as may be gathered by anyone possessed of ordinary powers of observation, and without having recourse to special appliances and means of investigation.

In the two following chapters the physiology of the Crayfish—in other words, the working of the mechanism of its digestive, respiratory and circulatory organs, of its muscular and nervous systems, and the various organs of sense and reproduction—is described; and here, as in the succeeding chapters devoted to the consideration of the Crayfish from a purely morphological point of view, a multitude of details which to the unscientific reader might have become, under less able treatment, wearisome and perplexing, are rendered interesting by the author's graphic style and skilful use of illustration, relieved by occasional digression on such topics as the nature of the Crayfish-mind,—that is to say, the question of its possession of consciousness is discussed, and the extent to which its sensations of light and darkness, form and colour, are comparable to those of animals higher in the scale of organization and possessed of more highly specialized organs of sense.

Proceeding next to the consideration of the morphology, or structure of the various parts and tissues, of the individual Crayfish, the composition of the exoskeleton and of the several body-rings or "somites" of which it is made up, and of their respective appendages is described, and it is shown how all are constructed on the same fundamental plan; the nature of the epithelium and of the connective muscular and nervous tissues is explained; finally, the development of the embryo from the

earliest division of the yolk to the period when it leaves the egg is briefly sketched out.

In his next chapter, Prof. Huxley treats of the *comparative* morphology of the Crayfish—in other words, its structure and development are compared with those of other living creatures. After a long description of the common English species of Crayfish, the terms “species,” “genus” and “family,” used by naturalists to denote the various groupings of animals possessing a common plan of structure, are explained, and it is shown how all the different kinds of Crayfishes may be regarded as modifications of a common Astacine plan; that in a similar way all the *Arthropoda* are connected by closer or more remote degrees of affinity with the Crayfishes, and that ultimately all living forms may be regarded as related to one another as being either cells or composed of aggregates of cells.

The author's classification of the Crayfishes by the peculiarities of their gill-structure is almost entirely original, although Erichson and Dr. Hagen had previously separated the Eastern and Western American species by a difference in the number of their branchiæ. The results of Prof. Huxley's researches have already been brought before the scientific world in his paper on the classification and distribution of the Crayfishes, published in the ‘Proceedings of the Zoological Society’ for last year; but they are exposed in a more popular manner in the present work, and characters of so much value to the student of the evolutionary history of the existing species have been discovered that we doubt not, when new workers have been attracted to the subject and the study has been pursued more into detail, important modifications of the systematic arrangement of the larger groups will result therefrom. In the *Astacina*, at least, good characters have been discovered for the definition of forms widely separated in geographical position, but hardly to be separated as species—certainly not as genera—by external characters.

The distribution of the Crayfishes over the surface of the globe, and the correspondence of their structural differences with the peculiarities of their geographical range is considered in the final chapter; each species, genus and family has its peculiar distribution, and that of the group as a whole is compared with the analogous distribution of the fresh-water *Salmonidæ*. All the Crayfishes of the Northern Hemisphere are shown to belong to

one family (the *Potamobiidæ*), and those of the Southern Hemisphere to another (the *Parastacidæ*), the two groups being separated by the wide equatorial belt of the earth's surface.

Perhaps the most interesting portion of the work to the student as to the non-scientific reader is that comprised in the latter part of this chapter, wherein Prof. Huxley attempts to show how the theory of evolution, and that alone, can adequately explain the known facts relating to the morphology and distribution of the Crayfishes. The manner in which they may have gradually spread themselves over the surface of the globe is traced out, and it is shown how facts which at first sight would seem to militate against the theory of development may be satisfactorily explained; how, for example, the existence of the same kind of Crayfish in the rivers of England and France, and the similarity of the Crayfishes of the Amurland and Japan, may alike be due to the subsidence of land that in former geological periods may have united what are two islands with the continents of Europe and Asia; while, on the other hand, the absence or scarcity* of Crayfishes in the area occupied by the fluviatile Crabs (*Telphusidæ*) may be due to the fact that the latter, being the stronger race, have either driven their rivals from the field, or successfully prevented them from entering rivers of which they were the earliest tenants. Not the least instructive section of this chapter is that devoted to the genealogy of the Crayfishes, so far as it can be made out from a comparative study of the fossil remains occurring in the various geological epochs.

The general excellence of the woodcuts with which this work is illustrated, and the very complete bibliographical Index, will greatly assist the student who is desirous of pursuing the study of the Crayfishes further into detail. We may remark, however, that Prof. Huxley appears to have overlooked a somewhat important paper by Von Martens on the classification of the Australian *Astacidæ*,† for he figures without certainly identifying the large and spiny species, which, described by Heller as *A. spinifer* and by Von Martens himself as *A. arcuatus*, is rightly identified by

* Prof. Huxley does not say *total absence*. In Japan, for example, to cite an extra-European instance, *Telphusa Dehaani* competes with *Astacus japonicus* for the possession of the rivers, and in Australia *Cheraps quadricarinatus* has been recorded by Von Martens from Cape York, together with *Telphusa transversa*.

† Monatsber. der Akad. Wissensch. Berlin, 1868, p. 615.

the latter author (who follows White) with the long-previously-described *Cancer serratus* of Shaw.

Â propos of the subject of systematic nomenclature, we may observe that Prof. Huxley identifies all the specimens of British Crayfishes that have passed through his hands with the species or variety designated *torrentium* by Schrank; as, however, it must be difficult, if not impossible, to determine to which of the modern species Fabricius applied the name of *fluviatilis*, we trust it may yet be found possible to preserve for the common Crayfish of Great Britain the name which has so long been applied to it in our systematic works—the designation, namely, of *Astacus fluviatilis*.

The Fauna of Scotland: with special reference to Clydesdale and the Western District.—Mammalia. By EDWARD R. ALSTON, F.L.S., F.G.S. 8vo, pp. 39. Glasgow: published by the Natural History Society of Glasgow. 1880.

In this recently published catalogue by Mr. Alston we have a section of a comprehensive work on the Fauna of Scotland, projected by the Natural History Society of Glasgow, the preparation of which has been entrusted to different naturalists, each of whom has taken up some special group. Mr. Alston does not enter into any details of description or economy, which may be found elsewhere, but confines his remarks strictly to the department of geographical distribution, endeavouring at the same time to reconcile the spirit and the letter of the British Association rules for nomenclature, by selecting the first clearly defined name for each species, while avoiding all unnecessary changes of well known and generally accepted names. As a result, Mr. Alston has produced a catalogue of practical utility and value, his tables of the comparative distribution of British Mammals in England, Scotland, and Ireland being especially interesting. As regards their distribution in Scotland there is still a good deal to be learnt, particularly in the islands; but Mr. Alston has made the most of the materials at his command, and has smoothed the path for future investigators by pointing out what is already known on the subject, and indicating in what respects further information is desirable.

A Guide to the Botany, Ornithology, and Geology of Shrewsbury and its Vicinity. The Botany by W. PHILLIPS, F.L.S.; the Ornithology by W. E. BECKWITH; the Geology by C. CALLAWAY, M.A., F.G.S. 12mo, pp. 65. Shrewsbury: Bunny and Davis.

THE first twenty-six pages of this little work are occupied with a list of the Flowering Plants and Ferns found within a radius of five miles round Shrewsbury. In the preparation of this list the author acknowledges his indebtedness to a larger work, 'The Flora of Shrewsbury,' by the Rev. W. A. Leighton, and states that for several years past he has made it his business to verify the records of plants mentioned in that book, which he has found to be very correct. As might naturally be expected he has been able to add several new localities for some of the plants, and has had to point out a few instances in which agricultural improvements have destroyed old habitats. In the present list, with a view to economise space, all common species are merely named, while the rarer species have the localities appended.

Mr. Beckwith's List of Birds, which follows, occupies about eight pages, and includes only those which have been observed within five or six miles of Shrewsbury—in all 165 out of 218 found in the county of Salop. Amongst the rarer birds, Mr. Beckwith includes the Red-footed Falcon, Lapland Bunting, Richard's Pipit, Rose-coloured Pastor, Glossy Ibis, and Sabine's Gull. He remarks that the Nightingale "has been heard near Meole and in other places within the last few years"; that the Red-legged Partridge has once been killed near Charlton Hill in 1878; and that the Pochard and Tufted Duck, having been observed on Almond and Bomere Pools in the third week of April, possibly breed in the neighbourhood. There is a heronry consisting of thirty or forty nests at Attingham, where they are strictly preserved by Lord Berwick.

The remaining pages are devoted to a sketch of the Geology of Shropshire, in which the author, Mr. Callaway, endeavours to remove some of the misconception which has prevailed in regard to the "Pre-Cumbrian Volcanic Series," and notices the chief elevations in detail. At page 50 he gives a list of Cumbrian Fossils of Shropshire, most of which are comparatively new to

science, and have been described by the author in the 'Quarterly Journal of the Geological Society' (vol. xxxiii., pp. 663-670).

Tunstall's 'Ornithologia Britannica': a Catalogue of British Land and Water Birds. Printed for the Author, in folio. London, 1771.

THIS is a reprint of a scarce ornithological tract of four pages, executed by photo-lithography, and for convenience reduced in size from the original folio to demy octavo. It is issued by "The Willughby Society," which was formed a year ago with the object of reprinting certain ornithological works interesting for their utility or rarity, and is the first of the series undertaken.

In a Preface by the Editor, Professor Newton, a few particulars are given concerning the author, Marmaduke Tunstall, the reader being reminded that a memoir of him is given by Fox in his 'Synopsis of the Newcastle Museum,' published in 1827. His museum, including his collection of birds, which, it is said, cost him several thousand pounds, formed the basis of the Museum at Newcastle-on-Tyne, and from specimens contained in it were drawn *twelve* of the figures of birds in Brown's 'Illustrations of Zoology,' and *fifty* of Bewick's well-known engravings. This catalogue is interesting for its "rarity" rather than for its "utility," since it contains no descriptions—merely a list in English, Latin, and French, of the species known to the author as British. For this reason, we apprehend, none of Tunstall's names, although published in 1771, that is, subsequently to the 12th edition of Linné's 'Systema,' can be allowed to take precedence of those of a later date to which recognizable descriptions are attached.

For the benefit of those who may not have seen a prospectus of "The Willughby Society," we may state that the annual subscription is £1, payable to the Secretary, Mr. F. Godman, 10, Chandos Street, Cavendish Square; that every member of the Society is entitled to one copy of each work printed in the year for which he shall subscribe (it being estimated that on an average three works per annum will probably be issued), and that copies are issued to members only.

A List of the Vertebrated Animals now or lately living in the Gardens of the Zoological Society. 7th Edition. Demy 8vo, pp. 550, with 48 Illustrations. Printed for the Society, and sold at their House in Hanover Square. 1880.

THIS so-called "List," the first edition of which appeared in 1862, has grown into a very useful book of reference, for it not only enumerates all the animals which have been received from time to time by the Zoological Society, but also contains an index, as it were, to papers in the 'Transactions' and 'Proceedings' in which, as regards many of them, important information may be found.

The number of species of each class of Vertebrates included in the present edition of the catalogue is stated to be:—Mammals, 615; Birds, 1329; Reptiles, 257; Batrachians, 41; Fishes, 83; Total, 2325. The greatest additions have been made in the first three classes; only two species of Batrachians and none of Fishes having been added since the issue of the last edition in 1877.

In one respect only do we find this catalogue defective; it does not inform us with any degree of certainty whether any specimen of a given species may be found in the Society's Gardens at the present time. We are well aware of the difficulty which must arise in attempting to afford information of this kind, for an animal which may be living when the catalogue is revised for the printer may be dead by the time the volume is ready for publication. Nevertheless, in cases where animals once in the Gardens are known to be lost to the Society by *death* or *exchange*, we think it would be desirable to express the fact of their non-existence by the addition of the letters *d* or *e*, as the case may require, in order that enquirers may judge what are their chances of finding a given species before making a journey to the Gardens expressly to see it. It would then be understood that all specimens not so marked were believed to be living at the date of revision of the catalogue.

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REPORT ON THE MIGRATION OF BIRDS IN THE AUTUMN OF 1879.†

BY JOHN A. HARVIE-BROWN AND JOHN CORDEAUX.

EAST COAST OF SCOTLAND.

PRINTED forms of enquiry and letters of instructions were sent to twenty-six lighthouses on the east coast of Scotland. Thirteen stations have sent in returns, and thirteen have either sent in none, or have returned blank forms, owing to unusual scarcity of birds. The stations from which co-operation was asked are the following, commencing with the most northerly. Those from which returns have been received are marked with a *.

*North Unst, Shetland; white and red sectors, fixed. Robert Burnett.

Whalsey Skerries, Shetland; white, revolving every minute.

Bressay Sound, Shetland; red and white alternately, rev. every minute.

*Sumburgh Head, Shetland; white, fixed. William Anderson.

*North Ronaldshay, Orkney; white, flash every 10 seconds. John Tulloch.

Start Point, Orkney; red, fixed.

*Auskerry, Orkney; white, fixed. Charles C. Irvine.

+ I would here direct attention to another paper of mine bearing upon this subject, which was read at the meeting of the Glasgow Natural History Society on Sept. 30th, 1879, and forms part of its 'Proceedings' for the Session 1879-80, now in the press. It forms a Report upon Migration of 1878, Journal of the severe winter of 1879-80, and Observations on the effects of the weather, under the different species of Mammals and Birds noticed. I read a similar Report on 1879-80 at the meeting of the same Society in March last.—J. A. H.-B.

- *Hoy Sound (Low), Orkney; white, fixed. Alex. Harp.
- „ (High) Orkney; red and white sectors, fixed. W. Gordon.
- *Cantick Head, Orkney; white, revolving every minute.
- *Pentland Skerries, Orkney; white, fixed. D. M'Donald.
- *Dunnet Head, Caithness; white, fixed. George M'Lachlan.
- Holborn Head, Caithness; white and red, flash every 10 sec. D. Charleson.
- *Noss Head, Caithness; white and red, revolving every $\frac{1}{2}$ m. Alex. Creig.
- *Tarbet Ness, E. Ross-shire; white, int. visible every $2\frac{1}{2}$ m. W. Davidson.
- Cromarty, E. Cromarty; red, fixed. Robert S. Ritson.
- Chanoury Point, Elgin; white and red sectors, revolving every minute.
- Covesea Skerries, Elgin; white and red sectors, revolving every minute.
- Kinnaird Head, Aberdeen; white and red sectors, fixed. F. Harvey.
- Buchan Ness, Aberdeen; white, flash every 5 seconds. Thomas Gallie.
- *Girdleness, Aberdeen; white, fixed. Wm. Gulcher.
- Montroseness, Forfar; white, fixed. Patrick E. Reid.
- *Bell Rock, off Coast of Fife; white and red revolving. James Jack.
- *Isle of May, Firth of Forth; white, fixed. Joseph Agnew.
- *Inch Keith, Firth of Forth; white, revolving every minute. R. Grierson.
- St. Abbs Head, Berwick; white, flash every 10 seconds. Robert Seater.

A general scarcity of birds is reported by a great majority of the observers on our east coast, which partly accounts for the absence of returns from several stations. Those sent in have been carefully prepared by the various reporters so far as materials allowed. Excluding Swans, Geese, Ducks, and Rock-birds, notes have been made on about twenty-eight different species.

SEPARATE REPORT OF EACH SPECIES OBSERVED.

At North Ronaldshay, an Owl—species unknown, but probably the Short-eared Owl, *Asio accipitrinus*—was seen on Nov. 3rd, flying south, at 10 a.m.; and at Dunnet Head a Horned Owl, also probably of the same species, struck three times, but got away. This was at 6 p.m.

From Pentland Skerries we have all the records of hawks. Two early records (July 7th and 14th) may refer to autumn migration or not. Thus, “a black hawk” was seen on July 7th at 3 p.m., and on the 14th another of the same at 7 p.m. On Sept. 17th one hawk struck at 11.30 p.m. The species is probably the Sparrowhawk, *Accipiter nisus*.

Accounts forwarded by other correspondents, however, show that Hobbies (*Falco subbuteo*, Linn.), visited the Lewis in some

numbers this year.† At Sumburgh Head the appearance of a White-tailed Eagle is recorded, but is only of local interest, as these birds are known to breed near that station. That a migration, however, does take place amongst Eagles, and mostly of this species, is undoubted. Mr. D. Dewar, an experienced ornithologist, writes me :—" Every winter, for this long time back, when we have a strong east wind in November, Eagles and Rough-legged Buzzards appear over Loch Tay. In November, this year, I saw four Eagles together, all White-tailed, and three Rough-legged Buzzards along with them."

SWIFT, *Cypselus apus*.—Only one at Sumburgh Head on May 25th, doubtless on the spring migration. Two were seen at 10 a.m., wind light S.W., breeze and haze. "Swifts, however, do not breed in Shetland" (*vide* Saxby's 'Birds of Shetland,' p. 147).

SWALLOW, *Hirundo rustica*.—I have returns from four stations, Sumburgh Head, Aukerry, Tarbet Ness, and Isle of May. At the northernmost station (Sumburgh Head) "a number were seen flying about," at 11 a.m., wind at W.S.W., fresh and hazy. But this record was on June 12th, so probably refers to the spring migration. Their earliest appearance noted is August 21st, when four struck at Aukerry at 1 a.m., wind S.E., strong with fog; the latest Oct. 27th, when two were killed at Tarbet Ness at 7.10 p.m., wind N.W., light with fog. This shows migration between Aug. 21st and Oct. 27th. A "rush" appears to have taken place at the Isle of May on Sept. 19th, at 2 a.m., wind light E. with fog, when a flock of young birds was seen and four of them were wounded against the glass. Swallows migrate in August and September with an E. to S.E. wind, light to strong. In October my only record at Tarbet Ness gives wind N.W., light with fog. When the wind has been N.W., S.E. or E. there has been fog; when, in summer, at Sumburgh Head, W.S.W., there has been haze and rain. The last Swallow was seen in Berwickshire by Mr. J. Hardy on the 30th Sept. 1879.

MARTIN, *Hirundo urbana*.—From Pentland Skerries one record in which this species is distinguished from the Swallow. On August 25th one struck at 2.30 p.m. during a light W. wind with haze. The last was seen in Berwickshire by Mr. J. Hardy on the 3rd October, 1879.

† I have referred more fully to this in my "Report on Scottish Ornithology" for the Nat. Hist. Soc. of Glasgow for 1879-80.—J. A. H.-B.

WREN, *Troglodytes europæus*.—At North Ronaldshay five seen during the day-time on Nov. 21st, fresh breeze (direction not noted) with haze. Reported as usually appearing in large numbers at Aukerry, but the above-mentioned were the only ones seen.

GOLDCREST, *Regulus cristatus*.—The almost total absence of this species is specially remarked at the Isle of May. Usually they are abundant. These birds were decidedly scarce in Scotland throughout the summer.

ROBIN, *Erythaca rubecula*.—Only two records of this species on the east coast. At Tarbet Ness one was killed on August 6th at 10 p.m., wind light E. breeze, fog and rain; and at Inch Keith one struck on August 16th at 11.30 p.m., in similar weather, but with wind light W.

WHEATEAR, *Saxicola ænanthe*.—The most northerly station of the two recorded is Pentland Skerries, and to the south the Bell Rock. Between Sept. 7th—when great numbers struck and were lost at the latter station, and birds continued passing or flying round lantern between midnight and dawn, wind S.E. and variable, fog and haze—and Sept. 17th, Wheatears or “Stonechats” were on passage. If any rush took place it was between Sept. 7th and 11th, on which latter day fourteen were seen and two killed. Winds veered from S. and S.E. on Sept. 9th and 7th, to W. and S.W. on the 11th, 13th and 17th. All the birds passed at night between 8 p.m. and dawn.

TITMICE.—At only one station were Titmice observed on our east coast, viz., at the Isle of May, where some were seen on Sept. 15th at 10 a.m., wind light W. with haze. From Aukerry, however, there is the general report that they are in most years abundant there, though none have been seen this season.

SONG THRUSH, *Turdus musicus*.—Recorded from a number of stations from North Ronaldshay in the north to Aukerry, Pentland Skerries, Dunnet Head, Noss Head, Girdleness, and Bell Rock in the south. The greatest numbers noted were at Pentland Skerries, but great numbers also were noted at North Ronaldshay and the Bell Rock, where many “struck and were lost.” Their earliest appearance recorded is on Sept. 16th, when four struck at Noss Head between 8 p.m. and 10 p.m., wind S., moderate with haze. The latest date is Oct. 25th, when numbers, along with Blackbirds, struck at North Ronaldshay. The time

thus occupied was from Sept. 16th to Oct. 25th. A rush took place during October, and the greatest rush, perhaps, between Oct. 14th and 25th. At North Ronaldshay, on Oct. 1st, numbers struck, along with Blackbirds, and were flying about all night. Others seen at Girdleness, the Bell Rock, at Pentland Skerries, and Dunnet Head. Thrushes migrated when the wind was between E. through S.E., S.S.W. to N.W., but principally when southerly. Fog, haze, and rain on all the dates given. Time of migration, after dark and before dawn at all dates.

BLACKBIRD, *Turdus merula*.—Appeared at North Ronaldshay and the Bell Rock between Oct. 1st and Nov. 25th. A rush during this time recorded on three dates:—Oct. 1st, “Numbers flying about all night,” at North Ronaldshay, wind S.E., strong, “along with Thrushes.” Oct. 14th, four (two males and two females) killed; number flying about between 3 a.m. and dawn; wind N.E., fresh, with haze and rain. Nov. 25th, numbers, along with Thrushes, flying about all night; wind light E. breeze, haze.

RING OUZEL (or “Mountain Blackbird”), *Turdus torquatus*.—Reported from Sumburgh Head only, where one struck at 4 a.m.; wind light N. at 5 a.m., S.W. gale at 4 p.m.; weather clear. A number of the same species were seen in the country about the same time, and supposed to be young birds. At Aukerry, where they generally pass in large numbers, none were observed.

Besides the above, “large Thrushes,” probably Fieldfares,[†] passed or were caught at Aukerry, in October; four on the 15th between 1 and 4 a.m., wind light N., clear; six on the 16th between 2 and 4 a.m., wind S.S.W., strong, haze; and two on the 22nd at 3 a.m., wind strong S.W., and haze. Large numbers struck the lantern at the Bell Rock, and were lost in the sea between midnight and dawn on Sept. 7th, and again at the same station on Oct. 14th, between 3 a.m. and dawn. These were mixed in flocks of Blackbirds, Thrushes, and “various” other species.

The great scarcity of Thrushes in Scotland all summer was caused by the severe winter of 1878-79 and late spring of 1879, a consequent “crowding down” upon lower latitudes taking place during that breeding season. I have referred very fully to this in my first Report on Scottish Ornithology for the Natural History Society of Glasgow for 1878-79 (now in MS., ready for press),

[†] Afterwards identified as such by the head, wings and tail sent in later communication.

read Sept. 30th, 1879. This scarcity is still felt. In the birch-woods of the west coast I saw small flocks on Oct. 28th, 1879.

ROOK, *Corvus frugilegus*.—At Sumburgh Head numbers were seen about 9 a.m. on Nov. 2nd, wind N.N.W., strong to fresh, with sleet and snow showers. "Rooks do not breed in Shetland, but are often seen in the spring time, but very seldom in the fall, crossing, as is supposed, between Norway and Scotland." At Dunnet Head about 100 Rooks, mostly young birds, were seen at 12 noon, with fresh breeze from S.E. to S.W.

STARLING, *Sturnus vulgaris*.—Noted at only two stations. At Pentland Skerries on October 19th six struck between 6 p.m. and 4 a.m., wind S.W. and rain; on the 26th one at 8 p.m., wind W., and clear; and on Nov. 20th two at 6 a.m., wind S.W., strong and haze. At Dunnet Head, on Oct. 20th, seven struck and four were killed at night, wind N.W. and N.E., haze.

SISKIN, *Carduelis spinus*.—At Inch Keith three young birds struck at 1 a.m. on Sept. 16th, wind light W., fog.

LARK, *Alauda arvensis*.—Pretty generally recorded, but scarcer than usual; the northernmost station Pentland Skerries. They are also noted at Tarbet Ness and Girdleness. The most counted was thirty-six at Pentland Skerries between 5 p.m. and 4 a.m. on October 13th-14th, and the next largest number was sixteen, on Sept. 15th, between 8 and 10 p.m. Their earliest appearance was on August 16th, when four struck at midnight at Tarbet Ness, wind light S.E. and haze; the latest Nov. 19th, when nine struck (four killed) at the same station at 8.10 p.m., wind S.W., light and haze. The time occupied is thus between August 16th and Nov. 19th. A rush took place between Oct. 13th and 14th, or say about the middle of October, and again about November 19th at Pentland Skerries, Tarbet Ness, and Girdleness.

Larks migrated or came most under notice in S.W. winds, but also in S.E., N.E. (as at Pentland Skerries, when thirty-six were seen), and W. Our data from the Scotch coasts are too limited this year to admit of conclusions, unaided by the English returns. Haze and fog are recorded on all the days noticed. All records give hours of passing at night from 5 p.m. in October, and from 8.10 p.m. in November till 4 or 5 a.m.

WOODPECKER, *Picus (major?)*.—At Inch Keith two struck and an adult bird was killed at 9 p.m. on Sept. 15th, wind W., light breeze and fog.

LAPWING, *Vanellus cristatus*.—Reported to have left the vicinity of Hoy Sound in the third week of September. At Auskerry thirty or forty were seen about 3 p.m. on Sept. 11th, wind light W. and haze, and at Tarbet Ness a large flock was seen at 11 a.m., when the wind was N.W., light and haze on Oct. 12th.

PLOVER, *Charadrius pluvialis*.—At Pentland Skerries a flock was seen at 1.15 a.m. on Sept. 3rd, wind S.W., almost calm, with fog, and another flock at 2 p.m. on Dec. 7th, wind N.W. and clear. These represent earliest and latest dates. At Dunnet Head about 160 Plovers passed with S.E. wind and rain. At Tarbet Ness a large flock seen at 4 p.m., wind N.W., fresh and haze on Oct. 12th. Plovers remained unusually late on the high hills of Perthshire this autumn. On Oct. 15th I saw three on the hills around Glen Queich, and two flocks on the 16th. On the 14th was a snowstorm and ice a quarter of an inch in thickness on hill puddles.

HERON, *Ardea cinerea*.—At Girdleness on October 23rd two Herons were seen at 3.30 p.m., wind S.W., clear.

CURLEW, *Numenius arquata*.—Only three records, one of which no doubt refers to local migration or to late spring or summer. On June 29th a flock was seen at Pentland Skerries at 7.40 p.m. At Sumburgh Head, on July 30th, "a number crying very loud" were heard about 11 a.m., wind W.S.W. (gale on Aug. 1st), with haze and rain. At Pentland Skerries, on Dec. 11th, a flock was noted at 7.40 p.m. during light W. wind and clear. Did the migration last from July 30th to Dec. 11th? Curlews appear to migrate from early dawn to dusk, as far as records show. These birds were nearly a month late in arriving on our coast in Stirlingshire.

SANDPIPER (sp.).—At Pentland Skerries three struck and were killed; wind strong S.W. and haze.

WOODCOCK, *Scolopax rusticola*.—The most northerly station was North Ronaldshay. Thence southward, but nowhere in large numbers, seen or struck at Auskerry, Pentland Skerries, Dunnet Head, Tarbet Ness, Girdleness, and Isle of May. The largest number seen at any station at the same time being five at Tarbet Ness on December 3rd. A single bird is noted at Dunnet Head as early as Sept. 17th. None again till Oct. 15th, when one was killed at North Ronaldshay at 9 p.m., wind N.E., moderate, with sleet. The latest recorded was Dec. 3rd, when, as related above, five were seen at Tarbet Ness at 11.30 a.m., wind strong W., with

snow. The length of time occupied in migration was between Sept. 17th and Dec. 3rd. "Rushes" of migrants took place between Oct. 15th and 21st, but the reports are very meagre, being in most cases instanced by single birds striking at North Ronaldshay, Aukerry, Pentland Skerries, and Isle of May. Again a rush between Nov. 14th and 19th at North Ronaldshay and Girdleness; and again between Dec. 1st and 3rd at North Ronaldshay and Tarbet Ness. In two cases only have more than single birds been recorded. The migration took place principally when the wind was between S. and W.; but I have records of their flights also in strong N. wind with snow, on Dec. 1st, at Tarbet Ness; in N.E., moderate breeze with sleet, on Oct. 15th at North Ronaldshay; and again, with an E. light breeze and clear, on Dec. 21st, at the same station. When the wind has been S.W. or W., there has been fog or haze; when S., rain, as in November, on the 14th and 15th. Woodcocks appear to migrate principally at night, and are observed during the hours between evening dusk and morning grey, or, in other words, between 7.30 p.m. and 5 a.m. Exceptions occur, as at 11 a.m. at North Ronaldshay, 11.30 a.m. at Tarbet Ness, 2 p.m. at North Ronaldshay, and 3.30 p.m. at Girdleness; these last being all in daylight. A flight came inland in Stirlingshire about Nov. 22nd, on which day a party of five guns, of which party I was one, killed eighteen in Torwood Covers.

SNIBE, *Gallinago scolopacina*.—At the Isle of May one was seen at 10 a.m. on August 6th, with light S.E. wind, fog and rain. Snipe scarce or much scattered, owing to wet season. Entirely disappeared from inland localities when the hard frost of beginning of December set in, and few returned all winter.

WATER RAIL, *Rallus aquaticus*.—One record at Girdleness; on August 17th, one was seen at 8 p.m., wind E. with rain.

GREY GEESE.—At Dunnet Head, on Sept. 3rd, thirteen Grey Geese were seen "going north" at 3 p.m., wind S.E., fresh, haze and rain.

BERNACLE GOOSE, *Bernicla brenta*.—At Dunnet Head a mixed flock of old and young (twenty-five) seen going W. on Sept. 7th, and five more on the 14th, during the day, wind light W. Fog on the 7th; clear on the 14th. *Anatidæ* were a month earlier in appearing on Loch Tay in the autumn of 1879. Geese were reported as unusually abundant from many localities.

SWANS.—Three Swans seen at North Ronaldshay flying south at 2.30 p.m., with W.N.W. fresh wind and clear, and again at same place at 9.30 a.m., on Nov. 27th, swimming on the water; wind strong N.E., and clear. At Pentland Skerries eight were seen at 2 p.m. on Oct. 26th; wind light W. and clear. At Dunnet Head three old and one young seen going S.W., at 1 p.m., breeze light, on Sept. 14th; and three old birds again on Sept. 22nd.

DUCKS.—At Tarbet Ness a large flock of ducks passed inland at 10 a.m., with a N. gale and snow, on Nov. 12th. At Girdleness, two ducks seen at 4.40 a.m., wind S.W., and haze, on Oct. 16th. At Tarbet Ness a large flock seen at 9.15 a.m., wind W., strong and snow, on Dec. 5th. At Dunnet Head seven ducks (Widgeon) stayed on the lake three days from Oct. 25th; arrived with W. to N.W. breeze and cloudy.

GUILLEMOT, *Uria troile*.—At Pentland Skerries a flock seen on June 25th, at 7.15 p.m.; wind E.N.E., and light haze. (Compare with notes on W. coast at Cape Wrath and elsewhere.)

PUFFIN, *Mormon fratercula*.—At North Unst innumerable Puffins seen on evening of April 24th.

COMMON SKUA (or "Bonxie"), *Stercorarius catarrhactes*.—At North Unst, usually appear about middle of April. "We do not see more than six or eight in a season."

PETREL, *Thalassidroma pelagica*.—Seen at North Unst in August, and at Dunnet Head on Oct. 10th, wind strong W., and haze, at 11 p.m.

TERN, *Sterna*.—Only one record. One struck at Pentland Skerries at 8.30 p.m. on Sept. 8th; wind strong S., and fog.

Terns always appear upon our Stirlingshire coast the end of August and beginning of September, remaining usually about a fortnight to three weeks.

The unusual scarcity of migrants is very generally reported upon at almost all the east coast stations. The remarks of the reporters, comparing the observations with former years, generally show this to be the case. Thus, commencing with our most northerly station, North Unst, I find it stated that, in most seasons, "Land birds, as Snow Buntings, Stonechats, and Starlings, strike the lantern." It is also stated that—"Until the last three years, large flocks of Iceland Gulls were seen during the month of April, going N.W. A few returned this

way." They are seen, however, every year in some numbers in October. At Sumburgh Head, Mr. Anderson says, "In twenty-one years I have not seen so few birds strike the lantern"; and Mr. Tulloch, writing from North Ronaldshay, says, "We have had so much of N.W. winds here this fall, that I think the birds have been kept more towards the south." Similar complaints of scarcity of migrants reach me from Auskery, Hoy Sound (High), Holborn Head, Ness Head, and Isle of May; and an entire *absence* of all birds—"since the schedules came to hand"—is reported at several of these stations. The reason assigned by Mr. Tulloch is no doubt the correct one. From other stations local influences probably have more to do with the scarcity, as, for instance, the unfavourable positions of the lanterns. Thus, Cromarty is "situated on the point of the town of Cromarty, and almost among the houses." During seventeen years that the present principal light-keeper has been there, he does not think that more than a dozen birds have struck the glass. Altogether, few of our Scottish stations are situated in as favourable positions for observation as the lightships of the English coast. Perhaps the Bell Rock and Isle of May are the most favourable in the south, and the Pentland Skerries and some of the Orkney and Shetland stations in the north.

Besides the records under the various species which have been identified, there are many records of birds striking or passing, which were not identified. It is from a comparison of these and the other records that I arrive at the conclusion that the above stations are the most favoured. Thus, large numbers of birds struck the lantern of Bell Rock, and were lost between midnight and dawn on Oct. 7th, and again on the 14th, between 3 a.m. and dawn; on both occasions in foggy, hazy, or rainy weather, &c., as is almost invariably the case. I have not been able to trace from actual data, except in a few cases, the direction of the flight of the migrants, as such has not, as a rule, been noted by the reporters. It would be an advantage to have this done next season, under the column in the schedule for "General Observations." The species which have appeared in greatest numbers are Thrushes and Blackbirds, Larks, Wheatears, and Swallows; whilst Hooded Crows—noted as most numerous on the English east coast—are absent from all the Scottish returns, and Rooks occur only in one very far north instance, *viz.*, at North Unst.

The line of flight of the *Anatidæ* is generally from N. to S., as explained further on by Mr. Cordeaux. I may mention here that this holds generally also on the west coast of Scotland, but that the lines of flight of the *Insessores* are influenced by local causes, and configuration and trend of the west coast. Thus the direction, according to previous experience, is often from N.W. to S.E. When migrating over or near land the lines of flight follow the great valleys and then the coast-lines, often cutting off promontories, as at the Ross of Mull. These are probably birds having a starting-point more to the N.W.,—the Hebrides, Iceland, and North America,—and others which in their migrations from east to west overshoot the land and “hark back”; but we will speak more of this in our remarks under “West Coast.” Land birds have passed at all hours of the day and night, flying generally low, and in almost all kinds of weather. The *Anatidæ*, as a rule, fly much higher, and consequently are only seen, or almost only, in clear weather.

Almost all records of birds caught or killed, or striking at the lanterns, are noted on dark or cloudy nights, with fog, haze or rain, or snow and sleet. The isolated stations, such as the Bell Rock, are most deadly; many are stunned and killed, and blown into the sea, at such localities. Birds on such nights often remain around the lights all night or rest on the window-sills of the tower and the balconies, or endeavour to obtain entrance to the tower. Whenever dawn appears they resume their flight towards the nearest land.

A great northward rush appears to have taken place at Bell Rock lighthouse between the 2nd and 11th of March, 1880, as noted in the duplicate schedule by Mr. James Jack, lately received by me. On the 2nd March great numbers of birds were seen flying about the lantern, apparently of various species, of which Blackbirds, Thrushes, and Mavises were recognised; wind S., light breeze, heavy sleet; sexes unidentified; a great number continued to strike hard on lantern all night from 10 p.m., and rebounding off, fell into the sea. On the 9th, great numbers, including Lapwings, Thrushes, Mavises, “Snowflecks,” Rooks and “Sea-piets,” from 5 a.m. till good daylight, when all disappeared in the fog; observer could not say in which direction they flew; wind S.E., light breeze, fog, and rain. This has been the largest migration seen this year; very large numbers of each species

seen. On the 11th March great numbers of Lapwings, Curlews, Blackbirds, and "Sea-piets," from 12 midnight till first streak of day, when all disappeared; cannot say in which direction; wind N.E., light breeze, and haze. A few struck lantern-lights and flew off again; sexes not made out. A perceptible increase in our birds at inland localities took place about this time, and notes on migration taken at various inland localities corroborate the rush at coast stations. Curlews were seen passing inland on March 6th for first time. Great Tits much increased in numbers, as also Chaffinches, Starlings, Thrushes, Blackbirds, &c.

EAST COAST OF ENGLAND.

Printed forms of enquiry and letters of instruction were sent to thirty-seven light-houses and light-vessels on the east coast of England. Twenty-five stations have sent in returns, and twelve have failed to do so. The stations from which co-operation was asked are as follows, commencing with the most northerly. Those from which returns have been received are marked with a *.

Berwick.

*Longstone, on the most easterly of the Farn Islands; white light, revolving every 30 seconds.

*Farn Islands (two lights); white, revolving every 30 seconds.

*Coquet Island, coast of Northumberland; two white lights in same tower.
Souter Point.

*Teemouth, No. 5 Buoy Lightvessel; one white light, fixed.

*Whitby, High Light; white, fixed.

Flamborough Head; two white, one red flash, revolving every half minute.
Spurn Point.

*Spurn, Lightvessel, six miles S.S.E. of Spurn Point; white, revolving every minute.

Bull, Lightvessel, mouth of Humber.

*Outer Dowsing, Lightvessel, 53 miles E.S.E. Spurn; red light, revolving every 20 seconds.

*Inner Dowsing, Lightvessel, 17 miles E. Sutton, on Lincolnshire coast; green, 20 seconds.

Dudgeon, Lightvessel, 35 m. E. Skegness, Lincolnshire coast; white, fixed.

*Leman and Ower, Lightvessel, 48 miles E.N.E. of Cromer; two white lights, one fixed, one revolving.

*Hunstanton, Lighthouse; white, fixed.

*Cromer, Lighthouse; white, revolving every minute.

- Hasborough, Lighthouse ; white, fixed.
 Winterton, Lighthouse ; white, fixed.
 *Newarp, Lightvessel, 12 miles N.E. Winterton ; white, three quick flashes, and 36 seconds in a minute dark.
 *Cockle, Lightvessel, 3 miles E. Yarmouth ; white, revolving each minute.
 *Lowestoft, Lighthouse ; white, revolving 30 seconds, and red light, fixed.
 *Corton, Lightvessel, 4 miles E. Lowestoft ; red, revolving 20 seconds.
 *Orfordness, Lighthouse ; white, fixed.
 *Shipwash, Lightvessel, 8 miles S.S.E. of Orfordness ; white, fixed.
 Languard Point, Lighthouse, entrance to Harwich River.
 Cork, Lightvessel, 5 miles off mouth of Harwich River.
 *Gallopier, Lightvessel, 40 miles S.S.E. of Orfordness ; two white, horizontal, fixed.
 *Kentish Knock, Lightvessel, 33 miles N.E. of North Foreland ; white, revolving each minute.
 *Nore, Lightvessel, mouth of Thames ; white, revolving 30 seconds.
 *North Foreland, Lighthouse ; white, fixed.
 *Goodwin, Lightvessel, Goodwin Sands ; white, revolving, three quick flashes in succession, 36 seconds darkness.
 *Gull-stream, Lightvessel, Goodwin Sands ; white, revolving 20 seconds.
 *East-side, Lightvessel, Goodwin Sands, 13 miles E. of Deal ; green, revolving 15 seconds.
 *South-sand Head, Lightvessel, Goodwin Sands ; white, fixed.
 South Foreland, Lighthouse ; white, fixed.
 Dungeness Point ; white, fixed.

Great credit is due to the observers of the various stations for the careful manner in which, as a rule, the returns have been made out. Taking them altogether the reports show truthful, accurate, and painstaking observation. Excluding the *Anatidæ*, Swans, Geese and Ducks, notes have been taken of about thirty-two different species.

SEPARATE REPORT OF EACH SPECIES OBSERVED.

Of *Raptores* two only are mentioned, the Sparrowhawk and the Short-eared Owl. Of the former one visited the Inner Dowsing on Oct. 1st, at 3 p.m. At the Gull-stream on Sept. 19th one alighted on deck and was caught. At the South-sand Head on Sept. 23rd a very large Sparrowhawk stopped to rest on the rail, going W. At the same station on Oct. 2nd another settled on the lantern, also leaving for the west. These may have been hawks in passage, or pirates beating in the track of small migrants. The Short-eared

Owl occurs only at Teesmouth; on Sept. 29th one passed at day-break, one on Oct. 1st at 7 a.m., and another on the 16th at 3 p.m.

I saw the first Short-eared Owl on the Lincolnshire coast on Oct. 30th. Twelve were seen at Spurn the same morning. It thus appears that the migration of this species has extended just over a month, from Sept. 29th to Oct. 30th.

FLYCATCHER, *Muscicapa grisola*.—At the Galloper on Sept. 13th, from 10 p.m. to 4 a.m., hazy, 200 to 300 birds, mostly Flycatchers; twenty killed against glass of lantern. At the Kentish Knock on Sept. 18th two dozen Flycatchers through night around lantern, rain, going S.W. at daylight; none killed. At the Nore, Aug. 22nd, at sunrise, mixed with Larks, and again on Sept. 7th, same hour, without Larks. At the Gull-stream, on Sept. 17th, at 3.20 a.m., E., thick rain, large quantities of Flycatchers; lantern surrounded by birds. On Oct. 11th-12th, 11 p.m. to 5 a.m., N.N.E., rain, large numbers of Larks, Starlings and Flycatchers in vicinity of light; many struck and went overboard. Time of migration extending over fifty-two days.†

SONG THRUSH, REDWING, FIELDFARE, BLACKBIRD, and RING OUZEL.—With the exception of the last, which is reported from Heligoland, the *Turdideæ* are noticed at fourteen stations extending over the whole coast-line. At the Longstone, on Sept. 11th, four Redwings killed at 3 a.m., gloomy and thick; on Oct. 30th and 31st Thrushes, Blackbirds and Redwings passed, wind E. and N. At the Farn Islands, Oct. 14th, Redwings, 9 a.m.; 15th, Thrushes and Blackbirds, N.N.E. half a gale; 22nd, several Blackbirds; 30th, same, and flocks of Redwings all day, E.; Nov. 20th, Fieldfares all day, E. strong; 22nd, same; Dec. 5th, 3 p.m., snow, Blackbirds and Thrushes. At Teesmouth on Dec. 1st, 10 a.m. to 1 p.m., snow, Redwings, Thrushes and Fieldfares, going from N. to S.W.; Dec. 2nd, a few Redwings. At Teesmouth lighthouse on Oct. 1st, at daylight, forty to fifty Thrushes, and twenty to thirty at 9 a.m. on the 7th; on Dec. 4th, at 6 a.m., one Blackbird struck the glass and was killed. At Spurn on Dec. 2nd, 9 a.m., large numbers of Thrushes. At the Outer Dowsing, Sept. 24th, four Blackbirds; on the 29th, 10 a.m. to 1 p.m., six Thrushes. At the Leman and Ower on Dec. 16th, Thrushes in company with Larks and Starlings all

† I find the following reference to this species in my note-book:—"Did not observe any Flycatchers, old or young, in this neighbourhood after the end of August: up to this time they were exceptionally numerous."—J. C.

through the night. At Cromer on Oct. 24th three Thrushes struck the lantern during the night; on the 30th four, and on Nov. 16th five others. At the Newarp, Nov. 28th, 9 a.m., six Blackbirds passed. At the Kentish Knock, Nov. 18th, one Thrush killed. At the Nore, Nov. 7th, four Blackbirds, going W.S.W.; Nov. 3rd, Fieldfares. At the North Foreland, Nov. 21st, 1 a.m., E.S.E., snow, one Blackbird killed. At the Gull-stream, Nov. 21st, cloudy and showers of snow, Starlings, Blackbirds, and Thrushes in the vicinity of light from 1 to 4 a.m.; six Starlings, four Thrushes, and one Blackbird killed. At the South-sand Head, Oct. 12th, dense fog, many Thrushes; several killed. General line of migration, with few exceptions, E. to W., carried on both by day and night; a considerable proportion, however, appear to arrive from daybreak to 10 a.m. Migration of Thrush extending over seventy-seven days, from Oct. 1st at Teesmouth to Dec. 16th at the Leman and Ower; of Redwing, sixty-five days, from Sept. 11th at the Longstone to Dec. 2nd at Teesmouth; of Fieldfare, twenty-eight days, from Nov. 3rd at the Nore to Dec. 1st at Teesmouth;† of Blackbird, seventy-two days, from Sept. 24th at the Outer Dowsing to Dec. 5th at Farn Islands.‡ On Oct. 29th, S.E. and E., *Turdus iliacus* crossed Heligoland in large numbers, “thousands and thousands passing on overhead; the same day, *T. torquatus*, “a few”; *T. merula* and *T. musicus*, “limited numbers”; “*T. iliacus* descending from invisible heights down to about one hundred feet above island,—three hundred feet above the sea,—then all of them passing on; when atmosphere got clear again, in afternoon, passage ceased.” Again on the night of the 30th, N.N.E., “enormous number of *Turdidæ* passing overhead.”

REDBREAST, WHITETHROAT, WREN.—The same notes in the reports applying generally to the three species, it is not necessary to treat them separately. At Coquet Island, on Sept. 13th, 11 p.m., two Redbreasts struck glass, not killed. At Hunstanton, on

† Mr. W. Eagle Clarke reports that on the 24th of January last large numbers of Fieldfares were seen between Easington and Kilnsea, near Spurn Point, and as they were the first seen in the neighbourhood this season they were no doubt immigrants, more particularly as the locality in which they were seen is one where they are only observed during or immediately after arrival. Large flocks appeared also in North-East Lincolnshire during the last fortnight in January, so far as my own observations go, composed entirely of old birds. Mr. Gätke also writes, “All January through, night from 10th to 11th, great many from the east; 21st to 24th, the same.”—*J. C.*

‡ Numbers of fine old cock Blackbirds arrived at Spurn during the latter part of January, and early in February at the same time with the Fieldfares.—*J. C.*

Oct. 13th, 1 p.m., fog, a Wren and Redbreast seen. At Cromer, May 23rd, 1 a.m., a great many Wrens; two killed, also one Redbreast; May 27th, 11 p.m., Wrens and Whitethroats, five killed (these last notes are referable to the spring migration); Sept. 12th, Wrens and three Redbreasts strike glass. At Spurn this autumn the Common Wren did not appear before the middle of December; they usually arrive about the end of October.† Redbreasts were very numerous at Spurn on Oct. 30th, wind blowing very fresh from N.E. None reported from Heligoland, but a great many *Accentor modularis* on Oct. 29th, wind S.E. and E.

GOLDEN-CRESTED WREN.—Most exceptionally scarce; only one mentioned, at the Cockle, on Oct. 16th, at 3 p.m., wind N.N.E., when one came on board and was caught. Three were seen in a garden near Spurn on Oct. 27th and 28th; none, so far as I am aware, on any part of the Lincolnshire and Durham coasts, neither are they mentioned in the Heligoland report.

TITMICE.—At the Gull-stream, Sept. 17th, 3.20 a.m., thick, rain, E., several Titmice seen round lantern amongst the Flycatchers. Mr. Gütke remarks, "There have been no *Parus major* all this autumn, and we have actually seen only one bird"; early in October, "daily some *Parus ater*, that come here rarely but when there is an appearance of easterly winds."

WHEATEAR.—At Hunstanton, May 24th, 11 p.m. to 2 a.m., drizzly rain, forty-one small birds killed, amongst them three Wheatears. At Cromer, Aug. 16th, 1 a.m., several Wheatears; four killed.

TITLARK, *Anthus sp.*?—At Spurn, May 25th, 1 a.m., rain, several Titlarks killed (referable to the spring migration). At the South-sand Head, Oct. 12th, 3 a.m., N.E., dense fog, Titlarks, amongst thousands of other birds, around and passing lantern.

SHORE LARK, *Otocorys alpestris*.—On Dec. 19th two were shot from a small flock on the Humber side of Spurn Point; these were received in the flesh on the 22nd by Mr. W. Eagle Clarke, of Leeds.‡ At Heligoland, on Oct. 1st, "some flights"; 5th, "some score"; 8th, "a great many"; 10th, "many flights"; on the 24th likewise, and again on the 29th, "many."

† A friend, the owner of several steam-tugs, informs me that he has frequently known the Common Wren to come on board his vessels when far from land on the North Sea.—J. C.

‡ Mr. Clarke subsequently informed me that on March 18th, this year, he saw a flock of about twenty Shore Larks at Spurn, and that during the past winter thirty-three have been shot there, in the proportion of two males to one female.—J. C.

SKY LARK, *Alauda arvensis*. — None reported north of the Humber, and a negative return from Heligoland. South of the Humber, from every station making returns, and showing a gradual increase towards the more southern stations, where they crossed in immense numbers. Earliest date of passage, July 24th, at the Goodwin, 10 a.m., ninety to a hundred flying N.W. to the nearest land, and again at the same station on Aug. 4th. After this no further notice till Sept. 17th, when the regular and normal migration of this species appears to have set in and continued without intermission till Dec. 27th. Leaving out the two earliest dates as exceptional, we shall find that the immigration of the Larks to our east coast was continued over 102 days. During October, November and December (first fortnight) they crossed continually, passing from E. to W., also from points S. of E. to others N. of W., over the narrowest part of the North Sea, as is shown in the returns of the most southern lightships—Gallopier, Kentish Knock, Nore, North Foreland, Goodwin, Gullstream, East Side, and South-sand Head; time, any hour of the day or night; direction of wind, variable. It would be quite impossible in a limited space to give anything like a detailed statement of the immigration of Larks, so a few extracts from my summary of the reports must suffice. There was a “great rush” of Larks and other species between Oct. 12th and 23rd. On the 16th October more birds appear to have crossed than on any day during the autumn. There was again a “final rush” of the laggards just preceding and during the outbreak of severe weather early in December. At the Newarp, Sept. 29th to Oct. 27th, on fourteen days, going W., no particular hour, some striking lantern at night. At the Cockle, Sept. 28th to Oct. 17th, as a rule, very early in the morning (4.30 to 9.20 a.m.), on foggy, thick nights stopping to hover round lantern, some strike and are killed; Oct. 9th to 16th, “great rush.” At the Corton, Oct. 22nd and 23rd, flocks passing all day to N.W.; Nov. 11th, many hundreds during day; and again on Dec. 25th, all day from N.E. to S.W., Ducks and Larks; Dec. 27th, hundreds of Larks during afternoon. At the Shipwash, from Oct. 9th to 16th; all day on 15th and 16th. At the Gallopier,† from Oct. 8th to 24th, Larks, Starlings and Chaffinches, generally

† Birds passing this station were all passing to E. or E.S.E. or S.E. in October. On Nov. 24th great numbers of Larks and Starlings were observed passing to N.N.E. See general remarks at end of report.—J. C.

during night; between these dates 135 of these species killed against lantern. At the Kentish Knock, Oct. 23rd, N.W., hazy, Larks and Chaffinches through night, "in clouds," sixty picked up on deck, and probably double this number falling overboard; Dec. 1st, from noon to 2.30 p.m., thick snow falling, Larks, Curlews, Starlings, Ducks, Chaffinches and Linnets, too numerous to mention; they came in clouds from N.E. to W.S.W. At the Nore, Aug. 4th to Dec. 6th and 7th, on forty-four days; on Dec. 6th and 7th, by hundreds all day, often mixed with Starlings, Linnets and Sparrows. At the North Foreland, on Sept. 17th, a few; Oct. 16th, midnight, misty, fourteen Larks and ten Starlings; 17th, between 3 and 4 a.m., ten Larks and nine Starlings struck. At the Goodwin, Sept. 17th to Dec. 7th, on nineteen days, going W. or N.W. or W.N.W.; Oct. 13th and 15th, in shoals throughout night; 13th to 22nd, "great rush." At the Gull-stream, Oct. 16th to 22nd, "great rush," flocks two hundred yards apart, passing westward. At the East-side, Oct. 9th to Dec. 12th, on seven days, E. to W.; on Sept. 23rd, going N. to S., with a N.E. wind blowing. At the South-sand Head, Oct. 12th, 3 a.m., dense fog, "great rush," thousands of Larks and other birds, many killed; Dec. 1st, 3 p.m., dense fog and snow, "final rush," Larks, Starlings, and fifty Curlews; twelve Starlings caught on board, but no Larks. Mr. J. H. Gurney, jun., writing from Lowestoft, says, "On Wednesday (Oct. 22nd), the arrival of Larks here was regular throughout the day." On Oct. 29th, at Spurn Point, Mr. W. Eagle Clarke, of Leeds, says, "Sky Larks arriving and passing south in thousands the whole day." Immense numbers also arrived on the Lincolnshire coast in the last fortnight of October. (At Heligoland, Oct. 29th, S.E., and E., "*Alauda arboreus*, many.")

SNOW BUNTING, *Plectrophanes nivalis*.—None at stations south of the Humber. At the Longstone, Sept. 5th, 8.30 a.m., wind S., one was seen on the rocks; my correspondent remarks, "Earliest date I have ever seen a Snow Bunting on these islands (Farn Isles)." At the Farn Islands, Oct. 3rd, 11.30 a.m., three Snow Buntings flying N.W.; Oct. 25th, afternoon, in flocks flying W. At Tees-mouth, Nov. 7th to Dec. 20th, several flocks between these dates flying N.W. At Spurn, Snow Buntings were first seen on the 28th October; and large flocks of from 400 to 500 in the Lincolnshire marshes during the first week in November. At Heligoland on Oct. 30th, N.N.E., "*Emberiza nivalis*, a great many," and on

the 31st, S.E., calm, overcast, "Snow Buntings and Finches." Leaving out the Farn Island date as exceptional,† we find the regular migration of this species to have commenced on Oct. 25th and finished Dec. 20th—fifty-seven days.

CHAFFINCH, *Fringilla cœlebs*.—Has occurred at several stations, and both north and south of the Humber. At the Longstone, Sept. 28th and Oct. 1st, 6 a.m. till noon, S. strong, rain and mist, flocks of Finches and other birds going W. At the Outer Dowsing, Oct. 13th, at noon, going E. to W.; Oct. 24th, 7 p.m., overcast, rain, thirty round lantern, two killed. At the Leman and Owers, Oct. 7th, N.N.E., gloomy, mixed flocks of Larks, Chaffinches and Starlings during day and night. At the Newarp, Sept. 26th to Oct. 23rd, on several days. At the Cockle, odd birds, on three days, strike lantern or come on board. At the Kentish Knock, Oct. 23rd and Dec. 1st (see Sky Lark). At the Goodwin, Sept. 17th, 9 to 11 p.m., overcast, hazy, flying round lantern. Migration extending from Sept. 17th to Dec. 1st—seventy-six days.

LINNET, *Linota cannabina*.—None registered north of the Shipwash, off the Essex coast, where from Oct. 9th to 16th flocks passed daily, all hours, going E. to W. At the Nore, Oct. 14th to Nov. 12th, invariably mixed with Larks. At the Gull-stream, Oct. 15th to 22nd, many flocks.

TWITE, *Linota flavirostris*.—One station only, the Kentish Knock, Oct. 24th, misty with rain, "Mountain Linnets," Larks and Starlings through the night; sixty picked up on deck, as many more went overboard. Nov. 8th, one caught on deck.

TREE SPARROW, *Passer montanus*.—Flocks of Sparrows‡ were noticed at several stations south of the Humber. At the Outer Dowsing, on Sept. 29th, at noon, and Oct. 13th, 2 p.m., travelling from E. to W. At the Kentish Knock, Oct. 22nd to Nov. 8th, going from S.E. to N.W.; on Nov. 8th two came on board. At the Nore, Oct. 27th and Nov. 15th, on latter day mixed with Larks. At the Goodwin, Oct. 6th and 22nd, passing to W.N.W. At

+ In a note to Yarrell's 'British Birds' (vol. ii., p. 6, 4th ed.), Prof. Newton cites, on my authority, the occurrence of a Snow Bunting on the Lincolnshire coast on Sept. 16th, 1875, as perhaps the earliest date for England. The Farn Island bird must now take precedence by eleven days.—J. C.

‡ It is not improbable that in some of the returns the entries may refer to the Common Sparrow. We know, however, that *Passer montanus* is such a constant and regular migrant to our east coast in the autumn that in the majority of cases it will refer to this species.—J. C.

the Gull-stream, Oct. 16th, large numbers of Sparrows and Linnets going W.; also on the 24th, 3.30 p.m., flocks 200 yards apart. At the East-side, Nov. 8th, 9 a.m., a flock going E. to W. At the South-sand Head, Oct. 8th, "French Sparrows"; 16th, the same, some settled on board. Time of migration Sept. 29th to Nov. 15th—forty-eight days. During September and October Tree Sparrows usually arrive in North-East Lincolnshire in flocks containing many hundreds. This year has been quite an exceptional one, and only a few stragglers have been seen. I suspect the persistence of north-westerly winds in the autumn has driven these and the great body of our immigrants much further southward than is usual. The returns indeed show this to be the case.

HOUSE SPARROW, *Passer domesticus*—Only once mentioned, at the Corton, Sept. 28th, 7.50 a.m., large flock going west, males and females. As the female of the preceding is undistinguishable from the male, this entry undoubtedly refers to the Common Sparrow. We know that the House Sparrow is a migrant across Heligoland,† and my own observations on the Lincolnshire coast tend to the same conclusion.

STARLING, *Sturnus vulgaris*.—Next to the Lark, the Starling occupies the most prominent position in the reports. It is noticed both north and south of the Humber at seventeen stations:—the Longstone, Coquet Island, Teesmouth, Outer Dowsing, Inner Dowsing, Leman and Ower, Cromer, Newarp, Cockle, Galloper, Kentish Knock, Nore, North Foreland, Goodwin, Gull-stream, East-side, and South-sand Head. Enormous numbers passed the southern stations in October, November and December. Sometimes in separate flocks, sometimes mixed with other birds. They crossed at all hours of the day and night, and in all winds and weather. Earliest recorded, Cromer, June 10th, 2 a.m., "quantity"; the Newarp, 7 a.m., on July 4th, going E. to W.; these were young birds.‡ Leaving out the earliest dates as referring to the migration of the young, we find that the regular immigration on to our east coast commenced on Sept. 22nd, when four were killed against the lantern of the Longstone at 3 a.m., to Dec. 16th

† See a letter by Mr. Gätke in 'The Times,' March 31st, 1877, on the "Migration of Sparrows."

‡ This bears out Mr. Gätke's observation in a letter dated Heligoland, 1879, when he says, "Hundreds of thousands of young Starlings from end of June to end of July. Hundreds of thousands of old birds during October, November, and later; young and old strictly divided in their migrations."

at the Leman and Ower—eighty-six days; migration E. to W. The Starling, like the Lark, appears to have a particular facility for immolating itself against the lanterns. At the Leman and Ower large numbers of Starlings, along with Larks and Chaffinches, were taken in October; at the Galloper (see Sky Lark); also at the North Foreland, and many other instances too numerous to mention. At Heligoland this year there have been no young Starlings during July; Mr. Gütke says he may perhaps have seen a hundred, and this is all.

HOODED CROW, *Corvus cornix*; ROOK, *C. frugilegus*; DAW, *C. monedula*.—The migration of Rooks is not noted on the English coast north of the Humber; south of this they were noticed at nearly every station as either Rooks or “Black Crows,” to distinguish them from the Hoodie or Grey Crow. Immense numbers of both Rooks and Grey Crows crossed on Oct. 16th from daylight to dark, travelling from E. to W. Noticeably at the Inner Dowsing, on Oct. 16th, large number of Crows, from N.E. to W.; at Hunstanton, on the 17th, Hooded Crows and Rooks all day; at the Newarp, on the 16th; at the Cockle, the same day, “height of rush,” Crows and Rooks, 9 a.m. to 6 p.m., going W., and again on the 22nd, 23rd and 24th, large numbers of Crows, Rooks, Starlings and Larks, from daylight to dark, passing W.; again on Nov. 8th, large flocks of Crows. At the Corton, on Oct. 16th and 22nd, continuous flocks of Crows, Daws and Larks all day, E. to W., also Nov. 8th and 11th and Dec. 27th. At the Shipwash, Oct. 15th and 16th, constant on 15th, till 12 a.m.; on 16th, 9 a.m. to 3.20 p.m., from S.S.E. to N.N.W. At the Goodwin, Oct. 15th to 21st, Crows “in shoals.” At the South-sand Head, Oct. 16th, Rooks, 9.30 a.m., going W.N.W. and N.W.; and seven other stations. In the returns it is impossible in many cases, under the general entry of “Crows,” to separate the Hooded Crow from the Rook. It appears, however, that immense numbers of the *Corvidæ* crossed the North Sea; Rooks at stations south of the Humber, and Hooded Crows at both northern and southern stations from Oct. 15th to Nov. 19th. Both Rooks and Hooded Crows appear to have started simultaneously on Oct. 15th, and passed across the North Sea from E. to W. in almost continuous flocks on the 16th and 17th; and after these dates in more scattered detachments, less and less to Nov. 19th. And again during the latter part of December; the last entry is on Dec. 27th at the Corton,

Crows passing E. and W. in afternoon and Larks in hundreds. Daws are only mentioned at two stations; the Corton on Oct. 16th and 22nd, continuous flocks of Daws and Crows all day; also at the Shipwash on the 16th. At the Inner Dowsing on Oct. 22nd four Crows remained all night on globe above the lantern, and five took up their position in the same quarter on the night of Nov. 8th, leaving at daylight for the Lincolnshire coast. The wind on the North Sea on Oct. 16th was N. to N.E., force 4 to 7.

CUCKOO, *Cuculus canorus*.—On Sept. 17th, 10 p.m., at the North Foreland, wind E., overcast, misty, a Cuckoo struck the south side of the lantern, but was not killed.

SWALLOW, *Hirundo rustica*.—The spring migration was noticed at two stations—the Cockle, June 8th, 9.20 a.m., five Swallows passed towards land; also on July 1st at 4.30 a.m., ten passing to W.S.W.; at the South-sand Head, July 6th, twenty at 3.30 a.m., flying towards N.N.W. The autumn migration was observed at several stations both north and south of the Humber. At Coquet Island, Aug. 15th, midnight, S.E., three Swallows struck glass of lantern, but were not killed; on the 20th great numbers were seen flying about, two striking glass after dark, but were not killed. At Whitby, on Oct. 4th, 9.30 a.m., flock going south. At Hunstanton, on Sept. 16th, 2 p.m., a flock alighted on lantern and gallery; and on Oct. 12th, 3 p.m., fog, twelve came up to light and dispersed in various directions. At the North Foreland, on Sept. 9th, 10th and 11th, about forty passed each day; and on the 21st, about one hundred flew round the lantern top for an hour. At the South-sand Head on Sept. 28th, twelve Swallows passed. Migration extending from Aug. 15th to Oct. 12th—fifty-nine days.

SWIFT, *Cypselus apus*.—The autumn migration of Swifts, so remarkable in 1879 for the great numbers seen at various places on the north-east coast (see Zool. Jan. 1880, p. 8), was observed at only two stations. At Teesmouth, great numbers flying about during the last three days of August. At the Nore, on Aug. 1st and 2nd, between 6 and 7 a.m., and again on the 20th; last on Oct. 10th, 9 a.m., Swifts mixed with Larks. At Heligoland, Martins and Swifts, “rather great numbers during August; particularly noted on the 16th, wind S.E., Swifts a great many; on the 20th, the same.”

CHARADRIIDÆ.—The burst of severe weather during the early days in December brought an immense influx of Plovers to our

east coast from the north; large flocks are noticed at this time at the more northern stations, more particularly at Coquet Island on Nov. 26th and Dec. 6th, northerly and westerly winds, force from 6 to 8. There is only one notice south of the Humber, and this early in the season. At the Shipwash, Oct. 12th, flock of thirty Lapwings, going westward.

WOODCOCK, *Scolopax rusticola*.—Was observed at the Farn Islands, Oct. 22nd, 30th (great flight), Nov. 1st, Dec. 2nd, N.E. to N.N.E. At Coquet Island, Sept. 29th, S.W., strong, one; and Oct. 24th, also one; about noon on both days. At Teesmouth, Nov. 2nd, three at daylight. At the Outer Dowsing, a station more than fifty miles from the nearest land, on Dec. 12th, two flying W. At Heligoland, Oct. 30th, N.N.W., early at dawn, great many Woodcocks; about 100 killed. Great numbers were shot on the Yorkshire and Lincolnshire coast on the morning of Oct. 31st, sixty at Spurn Point alone; wind very fresh from N.E. on the previous night with drizzly rain. The migration of Woodcocks extended from Sept. 29th at Coquet Island to Dec. 12th at the Outer Dowsing—seventy-five days. The “great flight,” at Heligoland on the morning of Oct. 30th; east coast of England, on the night of the 30th.

SNIPE, *Gallinago media*.—At the Longstone, Sept. 17th, 2.30 a.m., misty, one struck the lantern and was killed. At the Farn Islands, on Dec. 2nd, 10th and 19th. At the North Foreland, on Nov. 14th, 1.30 a.m., N., moderate gale, and again on the 21st, at 5 a.m., snow, Snipe were killed. Very large numbers arrived in Holderness and North Lincolnshire, from the middle to the end of November, just preceding the outbreak of severe weather in December. They left the district again, almost to a bird, before the middle of the month.

CURLEW, *Numenius arquatus*.—Curlews were in large flocks at Teesmouth on Sept. 27th. At the Inner Dowsing, Sept. 1st, three going from N.E. to S.W. At Hunstanton, on Oct. 13th, 4 a.m., fog, one struck glass of lantern and was taken. At the South-sand Head, Aug. 13th to 29th, large flocks, 100 to 200 in a flock, going S. and S.W. The Curlew migrates early in the autumn, Aug. 13th to Sept. 29th. Most of these entries will probably refer to young birds, the old Curlews coming later in October and November. At Heligoland, Oct. 30th, many passed over.

ANATIDÆ.—Between Dec. 4th and 20th Swans passed the

Teesmouth from N. to S. in some numbers; on the 4th, six; the 8th, five (four old and one young); 14th, nine (eight old and one young); 15th, forty-three; 16th, three; 18th, two; the 20th, ten at 10 a.m., and ninety-five at 11 a.m. On the 18th a flock of thirty was seen near Spurn, one old white bird acting as pilot, the remainder all young, in the brown plumage. Two Bewick's Swans were shot on the Humber on the 8th. Four passed the Kentish Knock, on Dec. 4th, 2.15 p.m., N.E. to S.W. Two Swans, which may have been "escaped birds" from some private waters, passed the Teesmouth on Sept. 30th, 10 a.m., flying S.E. Geese were observed at several stations both north and south of the Humber, going south from Aug. 18th to Dec. 13th, the main body passing south during the last half of November and in December. Brent or "Black Geese" are noted at the Corton, going south, July 18th, twelve; July 30th, two flocks of from thirty to forty; on Sept. 17th, thirty. These are very early dates for Brent Geese.† Mr. Cotton, the observer, might have possibly been led into an error by passing flocks of black Scoters. As, however, "black ducks" are frequently mentioned in his return, this could hardly be the case, and he appears very well able to discriminate between the two. At the Corton, Dec. 4th, hundreds of black geese from N.E. to S.W. from sunrise to noon—i. e., towards the mouth of the Thames or Essex coast. As might have been expected, large flocks of Ducks are constantly noted, so frequently, indeed, as to defy repetition; this is more particularly the case in the returns from the lightships. They are noted sometimes flying S., from the land or to the land, and in fact in every direction. Many of these would be local flocks going to and from their feeding grounds. Immense numbers, however, coming from the north, passed along the coast in November and December. At Coquet Island, on Dec. 14th, 3 a.m., N.W., blowing a gale, two Eider Ducks (spelt phonetically, "Ida" in the report) struck lantern and one was killed.

RED-THROATED DIVER, *Colymbus septentrionalis*.—Red-throated Divers and Mergansers are mentioned in the report from Teesmouth during November. With regard to the first of these, Mr. Gütke sends the following curious note, dated Dec. 22nd, 1879:—" *Colymbus septentrionalis*, almost by the million. During

† Major C. Russell, writing from Essex, says, "The earliest occurrence of Brent Geese on our coast I ever remember hearing of was Sept. 29th, when many years ago one of our coast gunners, still living, killed ten at a shot."

the last forty years there have never, during a single autumn, been a fiftieth part of what we see here now every day—all passing along, principally during the forenoon, east of the island in an E. by N. direction, which I think they continue till coming to the Holstein coast, then strike off in a northerly course up to the extreme north of Jutland, and from thence cross over to the Dutch coast, perhaps next morning to renew the trip. There are constantly so many that one scarcely can believe them always to be fresh birds."

PROCELLARIÆ.—At the Longstone, on Sept. 18th, at 3 a.m., two Petrels were caught against the lantern-windows. At Coquet Island, on Nov. 4th, 3 a.m., one killed against the lantern. At the Goodwin, Oct. 11th, five were seen with many Larks and Starlings round the lantern at night. Greater numbers of *Procellaria glacialis* have been seen off Heligoland during the autumn than has been the case for the last twenty years.

Independent of the notes of each species, as already given, numerous flocks of small birds were seen passing the stations, but too far distant to determine the species. This was specially the case at the Spurn, on Dec. 3rd and 8th; at the Cockle, on Oct. 9th; and at the South-sand Head, on Sept. 20th. At the Kentish Knock, on Nov. 20th, half-a-dozen small birds came on board at midnight, which, from the written description in the margin, were probably Greenfinches. It is, however, impossible to give even a guess at another species which visited another lightvessel on Sept. 20th, "Fifty very small birds—in fact, the smallest of British birds—like a Sky Lark, but a deal smaller." From the date, they may have been either Titlarks or Flycatchers.

No rare migrants have been noticed, but this was scarcely to be expected. In this respect the budget of notes supplied by that veteran ornithologist Herr Gätke bears a striking contrast to our east coast reports. On that small island, so favourably situated for observation, Mr. Gätke has trained up quite a host of practical observers, and any rare visitant will have to be very sharp if it succeeds in escaping detection. Quoting from Mr. Gätke's letter dated Dec. 22nd, we have, on Sept. 17th, *Sylvia fuscata*, though not got; *Anthus Richardi* on the 18th; *A. cervinus* on the 20th; *Picus leuconotus* on the 21st; then some days S.W. with rain and no birds; 26th, calm and clear, *Emberiza pusilla*; 27th, E.N.E.,

Anthus Richardi, *Emberiza pusilla* (two shot), *E. aureola* (seen); 28th, *E. pusilla* (two seen), *E. rustica* (one shot); 29th, *Sylvia superciliosus* (one); 30th, *Emberiza pusilla* (one); Oct. 1st, *E. pusilla* (one); Nov. 2nd, 3rd and 4th, westerly winds and nothing, but daily some *Parus ater*; on the 5th, again, *Anthus cervinus* (seen and heard); northerly winds, sometimes N.E. on the 8th, a Leaf Warbler seen at close quarters, but not procured by Aeuckens, the Heligoland birdstuffer, which Mr. Gätke feels tolerably certain was a very rare visitant; the same day there were two or three *E. rustica*, and one each of *A. pusilla* and *A. cervinus*. The rare Leaf Warbler was again seen on the 9th, but could not be obtained; an *Emberiza rustica* was also seen. On the 10th, *E. pusilla* shot and *E. rustica* seen. On the 12th, *Muscicapa parva* and *Motacilla lugubris*, which latter comes there rarely in autumn. On the 14th, *Sylvia superciliosus* was shot by Mr. Gätke's eldest son, and two more were seen by Aeuckens in a garden where shooting was not permitted. On the 18th, one very fine *E. pusilla* shot. On the 20th *Lestris affinis* was seen close by, but not shot, as it would have fallen in the sea and drifted away. This is the third, if not the fourth, known occurrence of the Siberian Herring Gull at Heligoland. On the 24th a large Redpoll was shot, which Mr. Gätke thinks can only be the Greenland bird, *Linota Hornemanni*.

A summary of the various returns show that four species, Larks, Starlings, Rooks and Hooded Crows, in the order given respectively, far outnumber any other, and of these four the Lark far exceeds the rest in migratory numbers. As a rule, the lines of migration followed have been from E. to W., or S.E. to N.W. direct on to the English coast. To the middle of October we find birds rarely coming from points north of east; after this date they appear to come occasionally from directions north of east, between east and due north. The line of migration of the *Anatidæ* has been from north to south, crossing the line of the *Insessores* at right angles.

There is one remarkable exception to the general rule of an east to west route in the case of the lightvessel on the Galloper Bank, forty miles S.S.E. of Orfordness. All entries in this return show birds passing to the E. or S.S.E. or S.E. during October. We can only account for this anomalous line by supposing the birds which cross the Galloper have previously struck the English coast at some higher latitude, and after skirting the coast line

shot off again somewhere near Orfordness and crossed the North Sea to the Belgian and French coasts between Nieuport and Dunkerque. On Nov. 24th a great quantity of Larks and Starlings passed the Galloper towards the N.N.E., a line which if persevered in would eventually bring them to the Dutch coast.

At the East-side from the 2nd to the 5th of November flocks of "Crows" were observed passing from the S. to the N., or from the French to the Suffolk coast. The great body of the immigrants during 1879 have crossed at the more southern stations, the four lightships on the Goodwin Sands, also the Nore, the Shipwash and Kentish Knock showing a constant and continuous stream on to the south-east coast. These birds would all cross at the narrowest part of the North Sea directly from E. to W. to the English coast. The long prevalence of north-westerly winds in October and November may to a great extent have deflected the lines of migration much farther to the south than is generally the case.

Migrants have passed the stations at all hours of the day and night, flying at no great altitude and in almost all winds and weather. When the nights are dark and cloudy, no stars appearing, in rain, fogs and snowstorms, flocks of birds during the night migrations will crowd round the lanterns of the lightships; many strike the glass and are killed, falling on deck or pitching overboard. On these nights birds will often remain for hours in the vicinity of a light, circling round and round, evidently having lost their way; at the first break in the clouds, the stars becoming visible, or the first streak of early dawn, they will resume their flight to the nearest land.

The "great rush" of immigrants was from the 12th to the 23rd of October. The "final rush" took place just preceding and during the first burst of winter, early in December.

The occurrences when birds travel dead to windward are very rare indeed, and then only with light winds. In the great majority of cases birds migrate flying within two to four points of the wind, sometimes with a "beam" wind, or even a point or two "abaft of beam." If the wind changes during the actual passage, birds will change the direction of their flight to suit the wind. Thus at the Shipwash, on Oct. 16th, from 9.50 a.m. to 1.20 p.m. the wind was N.N.W., flocks constantly passing from S.E. to N.W. from 1.20 to 3.20 p.m. the wind blew from N.N.E., and the birds passed

S.S.E. to N.N.W. If subsequent observations should prove the correctness of this rule, it will go far to account for all the irregularities of migration—the “why” birds are seen in great numbers in one year in any locality, and perhaps absent altogether in following seasons.

Subsequent to the writing of this report I have received several communications showing a large and very remarkable influx of immigrants on to the east coast of England in January and the first fortnight in February, 1880. On Jan. 24th great numbers of Fieldfares were seen near Spurn Point, between Easington and Kilnsea, and since this date they are reported as very numerous in the locality; with the Fieldfares came many fine old cock Blackbirds. In North-East Lincolnshire, also, during the last fortnight in January I saw many very large flocks of Fieldfares, apparently entirely composed of old birds; before this time scarcely any had been seen. Mr. Gütke writes from Heligoland:—“*T. pilaris* all January, through night from 10th to 11th, great many; also Oystercatchers and other waders coming from the E; also from 21st to 24th, the same.” These dates agree very well with the time of their arrival on our east coast. Short-eared Owls arrived in some numbers at Spurn in the last week in January. A very large flock of Snow Buntings was seen on the 8th February. On the Lincolnshire side I noticed an immense flock of the same species, fresh arrivals, on the 5th; and on the 11th thousands, also hundreds of Larks. This final and third “rush” of immigrants so late in the winter is curious, and may perhaps be explained by the comparatively milder winter over Northern Europe, compared with what we have experienced in the central and southern zones of Europe. We have indeed a recent precedent for this in the winter of 1877-78, when, after a long continuance of mild weather in Scandinavia, a sharp and sudden outburst of real winter drove the Fieldfares, as Mr. Gütke says, over Heligoland, on the night from the 27th to 28th January, in “countless flights.”

WEST COAST OF SCOTLAND.

PRINTED forms of enquiry and letters of instruction were forwarded to thirty-eight lighthouses on the west coast of Scotland and the Isles. Twenty-four stations have sent in returns, and fourteen have either sent none, or have returned blank forms, owing to the scarcity of birds. The stations from which co-operation was asked are as follows, commencing with the most northerly, and those from which returns have been received are marked with a * :—

- *Cape Wrath, Sutherland ; white and red alt., rev. every minute. J. M'Gill.
- *Rhu Stoir, W. Cromarty ; white, interval 1 minute. William Wither.
- *Butt of Lewis, Lewis ; white, fixed. George Edgar.
- Stornoway, Lewis ; 2 lights, white, rev. $\frac{1}{2}$ m., & white, fixed. R. Murray.
- *Island Glass, Harris ; white, fixed. William Innes.
- Ushenish, North Uist ; red, fixed.
- *Monach Island ; same tower, upp. white fl., low. red, fixed. J. Youngclaus.
- Barra Head, Barra ; white, interval $2\frac{1}{2}$ minutes.
- Rona, Skye ; white fl., every 12 seconds. David Dunnètt.
- Kyleakin, Rosshire ; white and red, fixed. David M'Culloch.
- *Isle Ornsay, Skye ; white, fixed. David Ross.
- *Ardnamurchan Point, Argyleshire ; white, fixed. David Laidlaw.
- { Hynish, Skerryvore Signal Tower, Tyree ; no lights.† William Crow.
- * { Skerryvore, off Tyree ; white, revolving every minute. „
- *Dhuheartach, S.W. of Ross of Mull ; white, with red sector, fixed. J. Ewing.
- *Sound of Mull, Tobermory ; red, green, & white sectors, fixed. W. M'Lellan.
- Corran Ferry, Loch Eil ; red and white sectors, fixed. Thomas Tulloch.
- Lismore Island, Oban ; white, fixed.
- *Fladda, Easdale ; white, with a red sector, fixed. James Langton.
- *Rhuvaal, Islay ; white, with red sector, fixed. David Spink.
- *M'Arthur's Head, Islay ; white and red sectors, fixed. Thos. Sutherland.
- *Skervuile, Jura ; white, revolving every $\frac{1}{2}$ minute. John Ewing.
- *Rhinus of Islay, Islay ; white fl. every 5 seconds. Andrew Lyall.
- *Lochindaul, Islay ; white and red sectors, fixed. William Mail.
- Mull of Kintyre ; white, fixed. James Thompson.
- Sanda, Kintyre Sound ; red, fixed.
- *Devaar, Kintyre ; white, revolving every $\frac{1}{2}$ minute. Charles Black.
- *Pladda, Arran ; 2 lights 8 yards apart, white, fixed. Thomas Grierson.
- *Lamlash, Arran ; green, fixed. David Waters.

† This station included by mistake, but retained for convenience, bracketed with the next.

- Turnberry, Ayrshire ; white fl. every 12 seconds. Charles Black.
 *Corsewall, Wigtown ; white and red alternate every minute. R. Laidlaw.
 *Loch Ryan, Wigtown ; white, fixed. Ralph Ewing.
 *Portpatrick, Wigtown ; white, fixed. James Beggs.
 *Mull of Galloway, Wigtown ; white, intervals. M. Morrison.
 *Little Ross, Kirkcudbright ; white fl., every 5 seconds. W. A. Mackay.
 Point of Ayre, Isle of Man ; white and red alternate every min. J. Blythe.
 Douglas Head, Isle of Man ; white, fixed. Alexander M'Donald.
 Chickens Rock, Isle of Man ; white, revolving every $\frac{1}{2}$ minute.

Thanks are due to the various observers for the careful way in which the schedules have been filled in. Excluding the *Natatores*, notes have been taken on about thirty species.

SEPARATE REPORT OF EACH SPECIES OBSERVED.

HAWK.—At Dhuheartach on Oct. 5th, two struck lantern at 8 a.m., light S.E. wind, and haze ; and another on the 8th, at 7 a.m., calm, with fog. At Mull of Galloway, on July 18th, a Sparrowhawk was killed at 11 p.m., S.E., light and calm, thick haze ; and one on Aug. 15th, at 1 a.m., wind variable, light air, fog and haze.

OWL.—I have only two records—one seen at Dhuheartach on May 30th, at 4 p.m., wind N.W., fog ; and the other at the same place on Oct. 20th, at 3 p.m., wind E.S.E., fresh, with haze.

SWALLOW, *Hirundo rustica*, L.—The most northerly station noted this year on our west coast is Rhu Stoir, but two records here evidently refer to the spring migration, being June 6th and 10th, when two were seen on each day. The most northerly station noted during the autumn migration is Ardnamurchan ; thence southwards at Skerryvore, Dhuheartach, Rhuvaal, Skervuile, Rhinns of Islay, and Loch Ryan. The earliest date on which they were recorded is 29th July, when one was seen at Dhuheartach at 6 p.m. ; wind N., fresh, with clear weather. The latest record is Sept. 25th, when forty or fifty were seen at Rhuvaal, at 4 p.m. ; wind S.W., fresh, with rain. The length of time thus occupied by the migration along the west coast of Scotland was, approximately, fifty-eight days. The greatest rush took place between the 20th Aug. and 25th Sept. ; and, as far as shown, at Ardnamurchan and Rhuvaal. At Ardnamurchan, twenty rested all night on Aug. 20th, and left in the morning. At

Rhuvaal forty to fifty were seen, as related above. Swallows appeared to migrate principally when the wind is southerly (S.W. to S.E.), in light, variable, or fresh head- or side-winds, and hazy weather. Exceptions are found, however, at Dhuheartach on July 26th, when the wind was N., fresh, and weather clear; and at Skerryvore on Aug. 17th, when one appeared at the lantern about 10 p.m. (two hours after lighting up) in a N.W. light breeze, with showers. Swallows migrate mostly by day, resting all night. My returns show that they passed at all hours, but mostly before dark.

MARTIN, *Hirundo urbica*.—Martins are noticed at two stations only, viz., Butt of Lewis and Corsewall. The migration lasted between July 29th and Aug. 16th, or during eighteen days (but data are defective). They travelled during the day, resting around the lighthouses at night, with S. to S.E. and S.W. winds; the only one killed was when wind was N.N.E., at Corsewall.

WREN.—The records are few of this species: usually noticed on migration in large numbers; they appeared at Monach Island and Dhuheartach. The earliest date is Aug. 17th, when "some" struck at 10 p.m., and between that and 3 a.m.; wind W., and haze. The latest date is Dec. 9th, when one was seen at 3 p.m., with S.W. breeze, and showers. In fourteen years Mr. Edgar never saw a Wren at the Butt of Lewis lighthouse.

GOLDCREST, *Regulus cristatus*.—At Mull of Galloway on July 18th, alighting all night and resting. Mr. Edgar's letter of 20th Sept. supplies the information that he has never seen Goldcrests at the Butt of Lewis—a negative fact of value in tracing their exact lines of flight. Perhaps in our next reports observers will state in their remarks if any of the species noticed in this one have hitherto been rare, or entirely absent from their stations in past years.

ROBIN.—Appeared at Kyleakin, and thence southwards at Skerryvore, Rhuvaal, Skervuile, Rhinns of Islay, and Corsewall. The largest number recorded at Corsewall, where fifteen struck on Sept. 15th, at 11 p.m.; wind S.W., light breeze, and haze. The earliest date is Sept. 10th—one at Skervuile, at midnight; wind S.W., light, and cloudy. The latest is at Rhuvaal, on Dec. 4th at 9 a.m., when one was seen; wind variable, light breeze, clear. Thus, time occupied is between Sept. 10th and Dec. 4th. A rush took place in September between 10th and 21st, but no

large numbers are recorded; in October another rush between 7th and 18th; on the former date numbers migrated with Larks and other species not known, and many were killed and fell into the sea at Skervuile. At Skerryvore one seen at 7 p.m.; wind S., fresh, with fog and rain. In September I have records on six days at four stations; in October two at two stations, and in December one at one station—Rhuvaa; they passed or struck mostly at night or morning, but a few through the day; winds mostly southerly, and hazy or foggy; a few in cloudy and clear.

HEDGESPARROW.—At M'Arthur's Head, on Sept. 28th, one struck at 1 a.m.; wind N.W., strong, with haze and rain.

WHEATEAR.—Wheatears or "Stonechecks" are recorded from Skerryvore as the most northerly station this year, and thence southward at Rhuvaa, Skervuile, Turnberry, Corsewall, and Mull of Galloway. The earliest appearance noted is on Aug. 15th, and the latest on Sept. 28th; thus the migration extended over forty-four days. The greatest rush was between Aug. 17th and 22nd. The migration took place entirely at night, and principally with southerly winds—S., S.W., and to W.; fewer in northerly or easterly winds. The favoured stations were Skerryvore, Rhuvaa, and Skervuile.

TITMICE.—The negative information that Mr. Edgar never saw any Titmice at the Butt of Lewis lighthouse is worthy of record. I have notes of their occurrence at M'Arthur's Head and Lamash; in each case a single bird struck the lantern, Nov. 16th and Aug. 17th, at 6 p.m. and 10 a.m. respectively; both during west wind, and light air.

FIELDFARE.—Occurred at Monach Island and Douglas Head, and is reported as usually seen at Butt of Lewis, though not this year. At Monach Island a number struck, and fifteen were killed, between 8 p.m. and 4 a.m., on Oct. 21st and 22nd; wind S.W., fresh, and drizzling rain. At Douglas Head one was seen on Oct. 16th, at 10 a.m.; wind N., moderate breeze, and cloudy.

THRUSH.—The most northern station is, for 1879, Isle Ornsay. Mr. Edgar; however, adds the general information that in most years the Butt of Lewis yields large numbers at the lantern; thence southward at Skerryvore, Dhuheartach, Rhinns of Islay, Lochindaul, Lamash, Corsewall, and Point of Ayre. The earliest date is Sept. 19th, when a mixed flock of Thrushes and

Blackbirds passed in variable winds, and clear, at Lamlash. The latest date is Dec. 3rd, when "Thrushes" passed Lochindaul in the "daytime." But this may be due to local influences and hard frost then registered. The next latest date is Nov. 24th, when one was seen in the daytime, 2 p.m.; wind N.E., fresh, clear; this would give sixty-six days for the passage, or, taking the later date of Dec. 3rd, seventy-six days. The rushes were on Sep. 19th (*ut sup.*); a "great rush" Oct. 21st to 28th. On Oct. 21st at Point of Ayr, two hundred "along with Blackbirds" seen at 1.30 p.m.; wind N. and N.W., strong, clear, with occasional showers. Also at the Rhinns of Islay, five seen, and so through records of Oct. 22nd, 18th to 28th, when three hundred "dark grey birds larger than a common Thrush!!?" (probably Missel Thrush, *Turdus viscivorus*) were seen at Point of Ayr; wind S.S.E., light, and hazy; and at Skerryvore about forty (of which ten killed) at 7 p.m.; wind S.E., light breeze, and haze. Thrushes travel with winds from S.E. to S.W. by preference, but also with winds from W. to N.E., through N.; observed most, as with most other species at lanterns, in hazy and rainy weather, but the great rush took place in "clear, with occasional showers," and "hazy and fine." Returns show that out of sixteen dates reported upon, only three show a diurnal migration, but one of these three is the rush of three hundred "dark grey birds larger than a common Thrush"† on Oct. 28th, at Point of Ayr.

BLACKBIRD.—The northernmost locality is Rhuvaal, where one struck on Dec. 1st, at 2 p.m., wind N.E., fresh; thence southwards at M'Arthur's Head, Skervuile, Pladda, Lamlash, Corsewall, Mull of Galloway, and Point of Ayr. The earliest date is Aug. 26th, at M'Arthur's Head. The latest date is Dec. 1st, at Rhuvaal. The time thus occupied by the migration was ninety-seven days. The rushes took place between 13th and 21st Oct., and the most favoured locality recorded is Point of Ayr, where on Oct. 21st two hundred "mixed Thrushes and Blackbirds" were seen at 1.30 p.m.; wind N.N.W., strong, and clear, with occasional showers. They were visible at the various stations in all winds, apparently from W. to E. and from S. to

† We shall refer to these under "Birds unknown," but we have thought it advisable to enter them here also; they can easily be erased in future comparisons if better data come to hand.

N.N.W. They appeared at all hours of the day and night, but most of the records apply to night migration.

STARLING.—The records of the Starling are very general; the most northern station given is Butt of Lewis, where the remark is made that they generally strike. This year, however, the most northern is Ardnamurchan Point, thence southward at Dhuheartach, Sound of Mull, M'Arthur's Head, Skervuile, Rhinns of Islay, Corsewall, Portpatrick, Mull of Galloway, and Point of Ayr. The earliest date on record is Aug. 11th, at M'Arthur's Head and Loch Ryan; at the former, one struck at 10 p.m., in S. wind, fresh, with haze; at the latter, two struck at 11.30 p.m.; wind E., light, with fog. The latest date is Dec. 18th, when one was caught at Skervuile at 11 p.m.; wind S.W., fresh, with haze. Thus the time occupied in passage was one hundred and thirty days, but the last date may have been due to local influence and keen frost at that time registered. The next latest date is Nov. 23rd, which would make the time spent in passage one hundred and four days. Rushes took place more frequently than with most species noted; thus, Sept. 19th, Oct. 12th to 25th, and Nov. 11th and 17th, may all be characterised as dates of rushes. The most favoured localities were Corsewall and Portpatrick, for frequency of records; and Ardnamurchan Point, Dhuheartach, Portpatrick, and Point of Ayr, for numbers of individuals. Starlings do not seem to have any choice of wind, as far as returns show. We find them migrating with N., W., and S.E. winds in almost equal proportions, with a preference—but very slight—to W. winds. They also pass or strike in E., S., and N.W. winds, but in fewer numbers. We do not think any deductions can be drawn from these data. But Starlings breed at many of the lighthouses or in their vicinity, so it is not always easy to determine whether, in every instance, they are on migration or not (as remarked by more than one reporter, *e.g.*, Mr. Edgar, at the Butt of Lewis, &c.). Out of seventeen dates reported on, only three show migration to have taken place during the day, viz., at Portpatrick (in two instances), and Ardnamurchan Point (3 p.m. in a gale).

FINCHES.—At Dhuheartach on Aug. 24th, one hundred were seen and twenty killed between 9 p.m. and 2 a.m., wind N.N.W., with haze; on Oct. 4th, six seen in afternoon, wind light and variable, with clear weather; again, on Oct. 8th, two were killed

at 7 a.m., calm, with fog. The above are all the returns of "Finches."

LINNET.—Only two records. At Rhuvaal on Sept. 9th, thirty to forty, old and young, were seen around the lantern at 10 a.m.; wind E. to N., breeze to stormy, with haze; and at Lamlash on same date and at same hour, fifty were seen; wind fresh breeze from W., and clear.

YELLOWHAMMER.—At Lamlash on Aug. 17th, one struck at 10 a.m., in light W. wind, and fog.

SNOW BUNTING.—At Monach Island, farthest north recorded, and at Dhuheartach and Corsewall. Earliest appearance Sept. 19th, when a flock was seen at Monach Island at noon, with S.W. light wind, and clear weather. Latest date Dec. 10th, when one was caught at Corsewall at 10 p.m.; wind variable, light, and haze; thus, time occupied was eighty-two days. A rush took place probably about Sept. 19th, when a flock was seen at Monach Island,—but our data are scanty,—and another about Nov. 10th, when a flock passed Corsewall. Other dates of record are Oct. 10th and 13th; they passed in N.W. and N. winds, in clear or cloudy weather; also in September in S.W., with clear weather, and variable wind, with clear or haze. All the records are during the night, except one at 12 noon, at Monach Island on Sept. 19th; wind S.W., clear.

LARK.—The most northern station noted this year was Dhuheartach, and thence southward they are noticed at M'Arthur's Head, Skervuile, Rhinns of Islay, Lamlash and Corsewall. The earliest date is Aug. 17th, when twenty struck at Dhuheartach between 10 p.m. and 3 a.m.; wind W., with haze. The latest date is Dec. 6th, when one struck at 9 p.m.; wind S.E., fresh, and haze, at Corsewall; the time thus occupied was one hundred and twelve days (but the last was no doubt due to the severe frost inland at that time). The previous date is Nov. 18th, which would make the time only seventy-nine days. The greatest rush appears to have been in October, about the 12th to 24th, but the numbers observed are so small that it is difficult to judge. The locality most favoured was Dhuheartach, whence I have returns on eight different dates, between Aug. 17th and Nov. 24th. An earlier rush took place about Aug. 17th to 21st, at Dhuheartach and Skervuile. A later rush about Nov. 15th to 18th at Dhuheartach, Skervuile, and Rhinns of Islay,

but of small dimensions. Larks appear to migrate principally when the wind is W. to S.W., or late in the season, when still more southerly, say S. Exceptions occur at Dhuheartach on Nov. 24, when wind was N.E., fresh, and weather clear; at Rhinns of Islay on Nov. 7th, wind N.W., light breeze; at Skervuile on Oct. 10th, when wind was N.; they migrate in calm, variable, light, or fresh winds, and are noticed at lanterns principally in haze and fog. They migrate mostly at night, at all hours, but the majority pass between 7.30 p.m. and 4 a.m. Those passing during the day were travelling when the wind was N. or N.E.; those passing at night when the wind was S. to W. So the returns show; but whether this indicates any *law of migration* or not remains to be proved by further observation.

LAPWING.—The most northern station which they were observed to pass at this season was Rhu Stoir; thence southward, they are reported at Isle Ornsay, Lochindaul, Devaar, Pladda, and Portpatrick. The earliest date given is Aug. 20th, when "flocks" were seen during the day in N. wind and clear weather; the latest is Dec. 11th, when one was killed at Pladda, at 2 a.m., wind S.E., light breeze, with haze. The next latest date given is Nov. 14th, when twenty-two were seen at 8.30 a.m. at Portpatrick, wind S.E., and haze. The time occupied, therefore, this year is from eighty-six to one hundred and thirteen days. Rushes took place about the 20th to 25th August, when several flocks passed Isle Ornsay and Lochindaul; again, Sept. 16th to 25th, a flock at Devaar, Portpatrick and Chickens Rock; another rush at Rhu Stoir, Portpatrick and Lochindaul about Oct. 27th. Lapwings travelled in clear or haze, rain, or showers, principally in S. and S.E. winds, on the west coast; but also in N. wind on Aug. 20th, and in W. and S.W. at Rhu Stoir and Lochindaul on Oct. 23rd and Nov. 1st respectively. They appear to travel equally by day and night.

POLOVER.—Three stations give returns of this species, viz., Skerryvore, Rhinns of Islay, and Portpatrick. The earliest date is July 27th, at Portpatrick. The latest date is Oct. 18th, at Skerryvore. The time thus occupied by the migration was fifty-three days. The principal rush took place about the beginning of September, and the favoured station was Portpatrick, where they were always observed passing inland with a S. to S.W. wind, light or strong breeze, during the daytime. Individuals struck

lantern of Rhinns of Islay at night, when wind was N., N.W., or S.E.

OYSTERCATCHER, *Haematopus ostralegus*.—At Isle Ornsay on Nov. 18th, one struck at 10.30 p.m.; wind S., light, with haze, and rain.

HERON.—At Dhutteartach on Oct. 8th, one seen at 7 a.m.; calm, fog. At Rhuvaal, Oct. 1st to 30th, "Storks" (afterwards identified as Herons) passed at 9 a.m.; wind variable, light, with showers.

CURLEW.—Island Glass is the most northern station noted for this species; southwards at Dhuheartach, Pladda, Portpatrick and the Mull of Galloway. The earliest date recorded is Aug. 3rd, when eighteen were seen passing Portpatrick at 10 a.m., wind E.S.E., strong breeze, with haze; the latest date is Nov. 20th, when eight were seen passing Island Glass, flying southward, at 2 p.m., wind light S.W., with clear weather. Thus the time occupied was one hundred and nine days. A rush took place in August—say 3rd to 26th—and again in November, 15th to 20th. Dhuheartach seemed to be a favourite station. Curlews migrated in all winds, and "boxed the compass" from E.S.E., through S. to S.W., W. and N.N.W.; they passed mostly at night. Two exceptions were at 10 a.m. on Aug. 3rd, and 2 p.m. on Nov. 20th, at Portpatrick and Island Glass respectively.

WHIMBRELS ("Small Curlews"), *Numenius phaeopus*.—At Lochindahl on Sept. 20th, seen for several days in flocks; wind S. to W., and rainy.

SANDPIPER (sp. ?)—At Rhinns of Islay on Aug. 22nd, one struck at 1 a.m.; wind S.E., light, and haze.

TURNSTONE, *Streptilas interpres*.—At Rhinns of Islay on Nov. 8th, one struck at night; wind S.W., fresh, and haze.

SNIPE.—At Isle Ornsay, a single Snipe takes position as the northernmost recorded at the lighthouses of the west coast in 1879, as late as Oct. 20th, killed at 10 p.m.; wind N., clear. Thence, records at Skerryvore, Dhuheartach, Rhinns of Islay, Pladda, Mull of Galloway, and Douglas Head. The earliest date, Aug. 20th ("sp. not known"), 4 a.m. at Pladda; wind S.E., strong breeze, and haze.† As a doubt occurs, next earliest date—a long jump later—is Oct. 11th at Rhinns of Islay, when one was killed between 12 p.m. and 3 a.m.; wind N., light, with haze.

† This may have been a Sandpiper.

The latest date is Nov. 15th, when, at Rhinns of Islay, sixteen were killed between 6 p.m. and 4 a.m., wind S., breezes and haze; and another record occurs at Pladda. Thus from Oct. 11th to Nov. 15th marks thirty-five days for passage. Snipe are thus seen to make a rapid passage. (Local migrations occur earlier from moors to lowland marshes in Scotland, September always producing home-bred birds in our lowland marshes.) Rush of foreign birds middle of November, 1879, as far as we can judge; but on Oct. 18th "numbers" kept about all night round lantern of Skerryvore; wind S.E., light breeze, fog, and rain. Migration mostly at night, judging from records, but also by day.

WOODCOCK.—The northernmost station on west coast in 1879 is Island Glass; thence southwards at Dhuheartach, Rhinns of Islay, Lochindaul, Devaar, Corsewall, Mull of Galloway, and Douglas Head. Small numbers recorded in all cases, except at Lochindaul, when about forty passed during the daytime on Dec. 12th, when the wind was variable, light, and the weather clear. The earliest date was Oct. 11th; one killed at Rhinns of Islay, at 10 p.m., wind N., light, clear; the latest Dec. 12th. Too few data to fix rushes, except the one in December, which no doubt was directly caused by the severe frosts then recorded; wind N. and W., except on two occasions, on Oct. 7th at Douglas Head, wind E.; and on Oct. 30th at Mull of Galloway, wind E.; and on two others, viz., variable and light, when (in the hard frost) the forty were seen.

CORN CRAKE, *Crex pratensis*.—Heard for first time at Lochindaul, June 2nd; at Kyleakin, June 9th, wind S.W., clear; and at Skerryvore, June 20th, wind strong S.E., with fog.

WILD GEESE (sp. ?).—At Monach Island a flock "mixed old and young" passed south at 10 a.m. on Dec. 13th, wind S.S.W., fresh breeze, with haze; this is the most northerly station noted. Thence southward they were seen at Kyleakin (passing N.W.) at 8 a.m., wind N.W., fresh breeze, and clear weather; also at Sound of Mull, M'Arthur's Head and Devaar. The earliest date is Aug. 17th (passing N.W.), and the latest Dec. 15th (twenty-four passing W., at Sound of Mull). A migratory movement is thus seen to have extended over one hundred and nineteen days. A rush took place on Oct. 20th and 21st, at Sound of Mull and M'Arthur's Head; and again on December 13th, 14th and 15th, at Monach Island, M'Arthur's Head, and Sound of Mull

respectively; the direction of their flight was usually W. or N.W. On Dec. 13th a flock passed S.; most passed with a S., S.S.W. or S.W. breeze, in cloudy or clear weather; in two instances with a N.W. wind. They were observed during daylight.

WILD SWAN.—At Devaar on Dec. 11th, six seen at 4 p.m., light airs, with haze; and on Jan. 4th, three were seen flying south, in clear weather, at Rhuvaal lighthouse. We say nothing of the reported occurrence of *Cygnus americanus* on our coasts, but think the record (p. 111) premature.

WILD DUCK.—At Butt of Lewis a Duck was killed on Dec. 1st, at 8 p.m., wind E., light and clear. Others occurred in November and December at Rhuvaal and Devaar. At Rhuvaal, between Nov. 1st and 30th, three or four hundred Ducks passed between 8 a.m. and 3 p.m.; wind variable, light, and showery weather. Most of the migration seems to have been observed through the day. In none of the reports are the species identified, being described as either "Ducks" or "Wild Ducks."

WIDGEON, *Anas penelope*.—At Monach Island on Oct. 27th, a few were seen at 12 noon; wind S.S.E., fresh, and clear.

SHELDRAKE, *Tadorna vulpanser*.—At Pladda, on May 23rd, six (two males and four females) seen at 1 p.m., wind N.E., light, and haze; remained on the island till the middle of June.

EIDER DUCK.—At Rhu Stoir on June 30th, two males and two females seen at 11 a.m.; wind S., fresh breeze, showers. At Dhuheartach on Dec. 3rd, twenty seen at 10 p.m.; wind N.E., light, clear. At Devaar on Dec. 13th, twelve seen at 1 p.m.; wind N.N.W., light breeze, haze.

STORM PETREL.—At Butt of Lewis in July, August, and September, an occasional bird at the glass, always at night, always in hazy or rainy weather, generally "haze and rain" together; wind in three out of four instances S.W., and once on July 3rd, W.N.W., stormy. At Rhu Stoir a good many were observed "not on passage" between 17th and 20th Aug. between 6 p.m. and 10 p.m., wind N. to E., light, haze and rain; and at Rhinus of Islay on Sept. 17th, one struck at 2 a.m., wind S., light, and haze.

SEA-FOWL.—The following notes upon sea-fowl as observed at several stations—notably at Cape Wrath—will, we think, prove interesting:—At Cape Wrath, Mr. M'Gill reports all the sea-fowl as deserting their breeding-haunts there on Aug. 16th, and both

old and young flying westwards. He roughly estimated the numbers which passed within his ken as follows:—300 to 400 Guillemots, 800 to 900 Razorbills, 800 to 900 Puffins, 100 Scarts, and 300 Sea-gulls. This was performed in an east wind, during hazy or rainy weather (see also under Solan Goose), and all left Cape Wrath in one day and about the same time, viz., 10 a.m. The Gulls passed continuously between 9 a.m. and 3 p.m. Notes from other stations can hardly be considered as applying to anything but local daily migration in search of food, as is constantly witnessed at any rock-bird station on the coast; thus, at Rhu Stoir large numbers passed towards S.W., and are specially noted on June 12th to 15th; also at Kyleakin, a large flock passed southward at 2 p.m., wind S.E. When at the Shiant Isles this summer, at the end of June, I witnessed a regular departure of thousands of Puffins to their feeding-grounds in the Little Minch, about 9 to 10 a.m.

SEA GULLS.—At Cape Wrath on Aug. 16th, three hundred passed west between 9 a.m. and 3 p.m.; wind E., haze, and rain. "Sea Gulls bred at the station, and all left on the same day, both young and old. The migration goes all to the west."

KITTIWAKE, *Rissa tridactyla*.—At Skervuile on May 31st, two at noon flying north; calm, clear.

TERN.—At Dhuheartach, six seen on the evening of Aug. 27th, wind S., cloudy; and four at the same station on the morning of Sept. 4th.

BIRDS UNKNOWN.—At Portpatrick on July 12th, a flock of small birds passed overhead at 8.30 a.m., wind S.S.E., fresh, and rainy; and on Oct. 13th a flock passed inland at 4.20 p.m., wind S.W., and rain; on Nov. 13th "a flock of birds not known" passed inland, wind E. by N., and clear. At Pladda on Aug. 20th, one Snipe, species not known, at 4 a.m., wind S.E., strong, and haze; and another on Nov. 15th. At Skervuile, on Nov. 14th, a number from 10 p.m. to 2 a.m., wind variable, light, and haze; and others on Oct. 7th at Skervuile; "many killed and fell into the sea."

RED-BREASTED MERGANSER.—At Corsewall, on July 20th, a "strange Duck" (since identified as a Red-breasted Merganser) was killed at glass at 2 a.m.; wind E., light, with haze.

SOLAN GOOSE, *Sula bassana*.—At Cape Wrath and other stations upon our coasts, an extraordinary annual migration of

Solan Geese is witnessed. Mr. M'Gill has reported to me specially on that of 1879, and kept as accurate a record as possible of the numbers which he estimated to pass westward. He writes as follows:—"The number of Solan Geese that migrate past Cape Wrath is beyond anyone's power to number, but I have come as near to it as possible. The first half of July the flocks were composed of old birds, and the rest of the time they were mixed old and young." Mr. M'Gill then gives the following list of Solan Geese seen passing west on fifteen days, between 14th July and 9th August, which I reproduce here:—

July 14th.	600 to 700.	9 a.m. to 8 p.m.	Wind E.	Clear.
„ 15th.	200.	9 a.m. to 8 p.m.	„ E.	Haze.
„ 16th.	40 to 90.	12 noon to 7 p.m.	„ E.	Haze.
„ 22nd.	200 to 400.	10 a.m. to 7 p.m.	„ N.-N.E.	Fog, rain.
„ 24th.	100 to 200.	8 a.m. to 6 p.m.	„ S.W.	Clear.
„ 26th.	300 to 400.	11 a.m. to 7 p.m.	„ S.W.	Haze.
„ 28th.	90 to 100.	7 a.m. to 8 p.m.	„ S.W.	Haze, rain.
„ 31st.	60 to 80.	10 a.m. to 5 p.m.	„ S.	Haze, showers.
Aug. 1st.	100 to 300.	8 a.m. to 6 p.m.	„ W.	Haze, rain.
„ 3rd.	300 to 400.	9 a.m. to 6 p.m.	„ E.	Clear.
„ 4th.	60 to 70.	10 a.m. to 7 p.m.	„ E.	Fog, clear.
„ 5th.	20 to 30.	8 a.m. to 5 p.m.	„ N.E.	Fog, rain.
„ 7th.	40 to 50.	9 a.m. to 6 p.m.	„ N.	Fog, rain.
„ 8th.	20 to 40.	8 a.m. to 7 p.m.	„ N.	Fog, rain.
„ 9th.	20.	9 a.m. to 5 p.m.	„ N.	Haze.

Thus it will be seen that from 2150 to 3080 were estimated to pass westward within view of Cape Wrath, between July 14th and August 9th, during fifteen days occupied on migration. All which were observed passed during the day—say between 7 a.m. and 10 p.m.—and apparently in all winds and weather. From the Butt of Lewis Mr. Edgar supplies the general information that the Solan Geese pass the station, arriving first in May, and leaving in the latter end of October, but giving no particulars as to direction of flight. At Mull of Galloway Solan Geese are reported as passing, on July 19th, in flocks. Mr. N. B. Morrison reports as follows:—"Saw them flying past to W.S.W. in wedge-shaped flocks as if on a passage, or changing locality." This was during the forenoon; wind S., light, and haze. "At 1 p.m. it began to rain, and continued for twenty-four hours; rain gauge at 9 a.m. of 20th, 1.72 inches. On 21st, 22nd, 23rd, and 24th,

very strong breeze, and showers; wind W.N.W. to S.W." Again at same station (Mull of Galloway) flocks continued passing all day; wind S.E., fresh, fog, and rain, flying in same direction. On 8th and 9th, wind S., gale; 10th, wind W., strong. In a later note Mr. M'Gill believes "that the Solan Geese strike the land first at Cape Wrath," and that the Geese which pass it are from Suliskerry.

On the west coast of Scotland, also, many observers make particular mention of the scarcity of autumnal migrants in 1879. At several principal and important stations this scarcity is of course most remarked upon, such as Butt of Lewis, Monach Island, Island Glass, Skerryvore, and Dhuheartach. During long experience at these and other stations, the several observers do not remember such great scarcity of birds during the autumn migration. From other observers' remarks it would appear that several of the west coast stations are not suitable for observations being made, from their land-locked situations or other local influences, such as Kyleakin, Sound of Mull, Corran Ferry, and others.

Many birds are killed at the lanterns of the more isolated lighthouses and are blown into the sea. Thus, in 1877, at Skerryvore, in the month of October, the number of birds killed was six hundred, chiefly the Common and "Mountain Thrush" (Ring Ouzel), but including also Blackbirds, Snipes, Larks, and one Wild Duck. The observer, Mr. W. Crow, was of opinion that about two hundred more were killed and blown into the sea. They came every night from the 1st to the 6th, about 8 p.m., and went away at daylight. "I would estimate," he says, "the number about the light on each of the above nights to be about a thousand." The direction of the wind was from S.S.E. to S., with haze; and no migration of birds was observed during the day. On Dhuheartach lighthouse rock, "two Hawks are seen every morning" while the migration lasts, which come to prey upon the small birds resting on the rock. A considerable flight of migrants took place about Oct. 7th, as upon the east coast.

The direction of the flight of migrants appears to be from east to west at the north coast stations, but from N.W. and N.N.W. to S.W. or S.S.W. at the stations farther south; and this is borne out by previous observations in former years by my

west coast observers at Tyree and elsewhere. Our observers have not usually reported the direction taken by the migrants, but there are enough data to prove the above lines. It would appear, therefore, that birds when passing from east to west often overshoot the land, and are compelled to turn back upon a new course, according to the direction of the wind. In 1878, Mr. W. Boyd (since deceased) wrote regarding the migration in Mull as follows:—"In the month of October I was fishing on Loch Assapol, near Bunessan. Almost every day I saw flock after flock of little birds—Larks, Buntings, Robins, and even Wrens—flying across the loch. All these birds were steering the same course, having apparently come from the outlying Hebrides, *viâ* Tyree, Iona, up the Rose of Mull, and were steering for the mainland. Fresh arrivals of different species of Ducks rested and then passed on. Wild Swans and Geese were seen far up in the air, all taking a bee-line for the south." On another occasion Mr. Boyd visited Tyree in December, 1878, and both he and a companion remarked "the extraordinary scarcity of common birds, and the unusual number of winter visitors. One day every Snipe they put up, instead of flying a bit and settling again, rose high in air, and went off due south-east as far as they could see, right across the sea, to Mull. The remark was then made, "The sooner we go south for powder and provisions the better; we are going to have an arctic winter," which, as is well remembered, was a perfectly correct surmise. It will thus be seen that the flights of wildfowl almost invariably are from N. to S. on both coasts, but that the smaller birds—land birds—as they fly lower, are more influenced by the configuration of the coast-lines, and also, no doubt, by the direction of the wind at the time. Our data are at present too scanty to lay down with precision the minutæ of their lines of flight, but another year's observations will probably greatly assist us. The same rules, as to time of day or night at which birds strike the lantern, holds upon the west coast which also obtain on the east, and the same remarks as to weather also hold good.

The above remarks upon the direction of the flights upon our west coast may prove of value in a comparison with Mr. Cordeaux's notes upon the direction of the flights at the Galloper Bank. We are aware here that birds pass overland on migration, crossing Scotland between the Firths of Clyde and

Forth, as they have been heard on calm nights crying as they passed over from W. to E., or from points N. of W. to points S. of E.; and day-flights have often been observed passing here from N.N.W. towards S.S.E., or from N.W. to S.W. I would instance here Bramblings, *Fringilla montifringilla*, natives of Northern Europe. (See Gray's 'Birds of the West of Scotland,' p. 137. The "column" of Bramblings there described as on migration were not "proceeding in a north-easterly direction," however, as stated by Mr. Gray, but were coming from a north-westerly direction, and were proceeding in a south-easterly direction.)

NOTES ON THE ORNITHOLOGY OF THE BRITISH POLAR EXPEDITION, 1875-6.

BY HENRY CHICHESTER HART,
Naturalist on Board H.M.S. 'Discovery.'

(Continued from p. 129.)

SANDERLING.—*Calidris arenaria*.—On the 10th August, 1875, I saw six or seven Sanderlings near Walrus Island, in lat. $70^{\circ} 25'$. In Discovery Bay they were very rare. On the 1st June, on the 27th July, and on the 12th August, 1876, single specimens were seen. On August 22nd I saw a few in Rawlings Bay, lat. $80^{\circ} 22'$; and on the 7th September I saw a few in the same locality, as on the 10th of the previous August. I was not able to obtain a nest of this species, though my colleague, Capt. Feilden, found one on June 24th, in lat. $82^{\circ} 33' N.$ ('Ibis,' 1877, p. 406). Dr. Cop-pinger thought Sanderlings were common, and breeding, in Polaris Bay.

RED-NECKED PHALAROPE, *Phalaropus hyperboreus*.—Upon the 9th and 10th July I saw several pairs of this Phalarope at Blase Dalen Lake in Disco. They were breeding amongst sedges on its shores in company with the Lapland Bunting and the Long-tailed Duck. I watched them for some time; they are extremely graceful in their movements upon the water, and while swimming about in search of minute aquatic insects were quite fearless, coming to within a foot or two of the bank whereon I stood. I found one nest, a loose fabric of grasses and sedges, on the ground amongst tufts of *Carex frigida* and *C. fuliginosa*. It

contained four eggs, which were unfortunately broken while I was swimming a torrent that intervened between Blase Dalen and Godhavn. The eggs, which were nearly hatched, were somewhat similar to those of the Ringed Plover, *Ægialitis hiaticula*, but smaller, rounder, and with bolder markings. A weak, low, plaintive whistle was the only note I heard the bird utter.

KNOT, *Tringa canutus*.—On the 4th August, 1875, I saw half a dozen Knots in Hayes Sound, lat. $78^{\circ} 56'$, and on the 25th, several were feeding along the shore, in company with Turnstones, in Discovery Bay. In the following year the first Knot I saw was upon the 31st May; after that they became frequent. On their first arrival, and until absorbed in their breeding duties, they were very wary, often feeding far inland by the loneliest swamps and pools. A pair of Knots which had evidently selected a breeding-place, upon finding they were watched, deserted the site entirely. When courting, Knots play with one another upon the wing, and upon the ground, in a most entertaining manner, pursuing, avoiding, and encouraging one another; while the clear, sweet flute-like whistle of the male is frequently heard. Later in the year, July 11th and 12th, when the young ones were just hatched, I was much interested in watching the parents carrying on the same manœuvres as the Lapwing to decoy the intruder from the young; running along the ground with outspread wings, feigning lameness, and taking short flights to re-align suddenly close to one's feet. In spite of most painstaking search and the offer of liberal rewards, all efforts to obtain the eggs of the Knot were unsuccessful. Upon the 11th July a brood of four, disturbed from the nest, were captured and brought on board alive. The nest was placed under a large flat stone, resting on two others which formed a sort of gangway; it was merely of leaves and dry grass, loosely laid together on the earth by the edge of a stream; I could find no trace of the egg-shells. Upon the following day three more young were caught; these were apparently a couple of days out of the shell, grotesque little things, very lively and active, with large dark eyes, the body very small, and the wing-pinions just showing. Their feet were almost as large as those of the full-grown bird, and they were able to run at a marvellous rate. Both the young broods were found three or more miles inland, and in each case close to a stream. Of a number of Knots' stomachs examined,

only one contained any food; this consisted of two caterpillars, (*Dasychira grænlantica*, Wocke), one bee, and pieces of an Alga (*Glaucocapsa magna*, Klr.). Dr. Coppinger saw Knots frequently in Polaris Bay during July, 1876; he met with one brood of five young together among stones.

ARCTIC TERN, *Sterna hirundo*, L.—In the end of June, 1875, many of these birds were seen seated on floating pack ice drifting out of Baffin's Bay. Terns were observed in the first week of August in Hayes Sound. The first Arctic Terns were met with in Discovery Bay in 1876, on the 23rd June; afterwards they became frequent, breeding along the shore on the bare shingle in several places; one nest with four eggs was found in Discovery Bay. On several occasions I watched these birds fishing for small fry of the Charr (*Salmo alipes*, Rich., *S. Naresii*, Günt.) in the large lake inland of Musk-ox Bay, lat. $81^{\circ} 46'$; but their chief food was upon green caterpillars, *Argynnis chariclea* and *Tipula arctica*; stomachs examined sometimes contained over a dozen caterpillars. Dr. Coppinger stated that Terns arrived in Polaris Bay in flocks of twenty or thirty in July; not, as a rule, breeding there. He found one nest, however, and described the parents as being unusually fierce in their endeavours to protect it.

IVORY GULL, *Pagophila eburnea*.—On the 19th August I saw birds of this species north of Cape Frazer, in lat. $79^{\circ} 42'$; they were probably breeding somewhere in the neighbourhood; they kept flying and screaming about the cliffs, and I watched them for some time, but the locality was inaccessible, and no search could be made for a nest. On the 30th July, 1876, I saw an Ivory Gull in Discovery Bay; after that date they became frequent, and were incessantly harassed by the Long-tailed Skua. These birds came northward after the breeding-season was over, there not being water in Discovery Bay to support them in the earlier months, when the other migrants made their appearance. All seemed adult birds, none of the spotted young having been observed. In Polaris Bay Dr. Coppinger observed a couple of pairs late in the season, but obtained no evidence that they bred there.

GREATER BLACK-BACKED GULL, *Larus marinus*.—I saw several of these birds at the end of June, 1875, upon floating ice in Baffin's Bay.

KITTIWAKE, *Rissa tridactyla*.—Kittiwakes were numerous in Baffin's Bay at the end of June. On the 16th July, 1875, I found this gull breeding in considerable numbers in Svarte Vogel Bay, lat. $69^{\circ} 42'$, in company with Glaucous Gulls, Iceland Gulls, Cormorants, Looms, Rotches, Dovekeys, and Razorbills, the last-mentioned bird being the least numerous. Kittiwakes were not seen north of Foulke Fiord, lat. $78^{\circ} 18'$, where I obtained a specimen and saw many more. I had no doubt they were breeding in this locality, which is apparently their northern limit.

ICELAND GULL, *Larus leucopterus*.—On July 16th, 1875, I took a young bird and an addled egg of this species from the same nest in Svarte Vogel Bay. The eggs were very like those of the Common Gull, the young bird being of a pale greyish brown colour. There were many Iceland Gulls in Svarte Vogel Bay.

GLAUCOUS GULL ("Burgomaster"), *Larus glaucus*.—On the 16th July, 1875, there were many pairs, usually isolated, breeding along the shores of Svarte Vogel Bay. Constantly on the topmost spire of some pinnacled iceberg, this handsome gull takes up his position alone, the lower ledges being crowded with multitudes of meaner birds. In Foulke Fiord there were many pairs, where I observed them foraging several miles inland: they are very voracious, and seem to be able to subsist independently of any open water, probably often depending upon Lemmings and other land animals for their food. Upon the 14th June, 1876, I saw a pair flying inland from Discovery Bay; this pair had, I believe, a breeding-place somewhere in the neighbourhood, as I saw them frequently at intervals till August 1st; they seemed to subsist entirely inland, and made their appearance before there was any open salt water. I watched this pair several times sitting on, and hovering about, a fresh-water stream between two inland lakes in Musk-ox Bay, apparently fishing for Charr. Dr. Coppinger saw one Glaucous Gull in Polaris Bay in July, 1876.

RICHARDSON'S SKUA, *Stercorarius crepidatus*.—In the month of June this bird was frequently seen in the North Atlantic, persecuting various Gulls. On the 10th July I watched a pair for some time near the small fresh-water lake a few miles inland, in Blase Dalen, Disco. I shot the male, and believe that they had been breeding in the neighbourhood.

POMATORHINE SKUA, *Stercorarius pomatorhinus*.—On the 15th and 16th September, 1876, I saw several of these birds in

lat. 72° to 73° , in the waters near Pond's Inlet. This was by no means the commonest Skua in any locality we visited, and was not observed to the north of the above latitude.

BUFFON'S SKUA ("Long-tailed Skua"), *Stercorarius parasiticus*.—The first arrival of this species in Discovery Bay was on the 28th May, 1876. They had already commenced to quarrel with the Snow Buntings. On the 5th June fresh numbers arrived, and by the end of the second week of June they were very common; one shot on the 7th June proved to be a female containing fully-formed eggs. As far as my actual observation went, these Skuas subsist entirely upon Lemmings, numerous specimens which I dissected containing remains of this animal alone; they seem, however, in all cases to reject its entrails, which probably possess some unpalatable or poisonous secretion. I have watched a Skua rapidly tearing out the viscera, and then devouring the rest of the body; and I have frequently found the discarded remains about lemming-grounds around Discovery Bay and its neighbourhood. I am inclined to think, however, from the extreme dislike shown to them by all other birds, that these Skuas are in the habit of destroying the nestlings of their neighbours. Skuas insult the Snowy Owl in the most gross and daring manner, defiantly flapping their wings and tail into its face and eyes. I found many nests and eggs of this Skua in Discovery Bay and its vicinity; the eggs are two in number, except in very rare instances, once three eggs having been found, and another time a single bird having been hatched. They make no nest whatever, laying their eggs upon the ground sometimes where it is bare, sometimes where thinly clad with herbage. The eggs are olive-green, sometimes with a brown hue, in their ground colour, rather thickly spotted and blotched with chocolate or blackish brown, and often marked with a few streaks of the same colour, especially at the larger end. The colouring is very variable, some that I have seen being like miniature Guillemot's eggs. The size is about that of a Kittiwake's egg, somewhat more pointed; the shell is remarkably thin. The first eggs were found on the 27th June. These Skuas are most courageous birds in defence of their nests; they will fly fearlessly at one's face, and in this act were often knocked down with the gun-barrel, sticks, or stones, their flesh being in much request for the ship's men. Skuas hover like a Kestrel, with tail and wings expanded, while

scanning the ground for Lemmings; in that position the two long feathers projecting beyond the outspread tail are very remarkable. When the visitor is at a little distance from the nest, the note of the Skua is exactly like the whine of a young puppy. On getting nearer this becomes a harsh, and at length deafening, screech. Skuas' eggs are easily to be found when the habits of the birds are understood, though from the uniform monotony of the ground's surface, and their being laid on the bare earth, it would otherwise be a matter of chance. At a couple of hundred yards from the nest, one of the birds—I believe the male—flies to meet the intruder; at about a hundred yards the hen, having left the nest, joins in; and then the attack and the din begin, rising or falling regularly as the nest is approached or departed from. At length, when both birds become uncontrollably enraged and audacious in their attacks, one may be certain the eggs are close by. I have often found their nests thus, scarcely troubling myself to look at the ground until the proper moment had arrived, and I was then tolerably certain to find their eggs close by my feet. By the 7th July the young were beginning to chip their way through the shell, and in a few days more were hatched. Some of our Esquimaux dogs became such skilful hunters after young birds, that those which had escaped from the shell had even a worse chance of subsequently preserving their existence. Hence young birds of any species were of great rarity. I have also observed that the Arctic Fox eats the Skuas' eggs as well as those of the Snowy Owl. Skuas are most powerful and graceful flyers, and seem to be more than a match for any of the animals of these regions: they will attack hares; I have watched a pair beating one about the head with their wings in so cruel a fashion that it seemed quite merciful to shoot it. In the late summer I have seen, on one or two occasions, these birds alighting on, and sitting for some time upon, fresh water in the neighbourhood of Discovery Bay. In the early season both sexes have the under parts from beak to vent snowy-white, with a tinge of golden yellow upon either side of the upper part of the neck. The breast becomes gradually clouded during the breeding-season, and before its close, the white feathers of the upper part have become brown. Before leaving their breeding-haunts the majority of these birds have their brown zone conspicuous above the white of the belly; it varies much, however, in extent and

intensity in different individuals. Both sexes take their turn in hatching; their cries and their flight are exactly alike; both fly at the intruder with equal courage, and, as far as I could observe, from examining a large number of specimens, they are similar in size and colour throughout the breeding season. A character, however, by which the sexes may be almost invariably distinguished, is the superior length of the long tail-feathers in the male. I have several times shot one bird of a pair and found its sex agreeing with my expectation from having observed this distinction when in flight. In the female, the two long tail-feathers are six inches, or a shade more, exceeding the shorter, while in the male there is a difference of at least seven, and in some cases eight inches in their respective lengths. In Polaris Bay, Dr. Coppinger observed a few pairs of this bird breeding in July, 1876.

FULMAR PETREL ("Molliemoke"), *Procellaria glacialis*.—On the 12th June, 1875, in lat. $52^{\circ} 28'$, I caught a Fulmar with a line and hook baited with a piece of fat. These birds are often so caught by sailors; they invariably get sea-sick when they are placed on deck, from which they are unable to raise themselves by flight. This specimen was much infested with small mallophagous ticks. From this point northwards, Fulmars were frequent and often abundant about the ship, especially upon floating ice in Baffin's Bay, and as far north as Cape York, lat. 76° . Afterwards they decreased in numbers up to Cape Sabine, in lat. $78^{\circ} 45'$. The first Fulmars which I observed on our homeward journey were seen upon the 11th September, 1876, in the neighbourhood of Whale Sound, in lat. $77^{\circ} 10'$.

ARCTIC SHEARWATER, *Puffinus major*.—Small flocks of this bird appeared about the ship on the 16th June, 1875, in lat. $52^{\circ} 23'$; after that they were frequently observed until the 26th June, when I saw them for the last time in lat. 58° , about a hundred miles south of Cape Farewell.

STORMY PETREL, *Procellaria pelagica*.—From the 5th to the 23rd June, lat. 53° to 59° , these birds were generally to be seen skimming the water in the neighbourhood of the ship. A little south of Cape Farewell, and a couple of degrees to the eastward, I lost sight of them until the 1st July, when I saw two Stormy Petrels off Godhaab, on the coast of Greenland, in lat. 64° . The occurrence of this bird in the Greenland seas has been disputed.

Upon several occasions I watched Stormy Petrels remaining quiescent for upwards of a minute upon the surface of the water, the wings being nearly closed, and the bird evidently at rest. Sailors catch Petrels by dangling out a bottom of fine thread astern, in which they entangle their wings; it is considered, however, most unlucky to kill them.

PUFFIN, *Fratercula arctica*.—On July 1st, 1875, I saw two Puffins as far north as lat. 64° , on the coast of Greenland, near Godhaab.

BLACK GUILLEMOT ("Dovekey"), *Uria grylle*.—First met with in lat. $63^{\circ} 24'$ on the 1st of July. Afterwards their breeding-places were noticed at various localities as far north as Bessel's Bay, in lat. $81^{\circ} 4'$; as about Upernavik and Kangitok; at Norman Lockyer Island and in Hayes Sound; in Dobbin Bay and at Cape Frazer. In 1876, the first Dovekeys were seen in Discovery Bay upon the 22nd July. I do not think they bred in the neighbourhood, there being no open water for them to subsist in, in the early part of the season. These birds did not associate in large flocks like other Auks and Guillemots. Dr. Coppinger observed a few Dovekeys at Polaris Bay and in Petermann Fiord in July, 1876. During his sojourn there, eight were shot for the sick. Tracks and open places in the ice seem, however, to appear earlier upon the opposite shore than upon that of Discovery Bay.

BRÜNNICH'S GUILLEMOT ("Loom"), *Alca arra*.—On July 16th I gathered Looms' eggs in Svarte Vogel Bay. These birds bred here in multitudes, nor did I observe any other species in immediate company with them, though other birds would inhabit the same range of cliffs, and isolated pairs of Glaucous Gulls bred here and there overhead near their summits. A number of these birds were shot for the consumption of the ships' crews at Sanderson's Hope, in lat. 72° —a magnificent wall of sheer cliff over a thousand feet in height, containing the most noted of the Greenland "loomeries." Boats started from both ships, but a heavy swell rendered our attempts less successful than we had anticipated. These birds make a very tolerable stew. Eggs were also obtained from Upernavik; they are very strong-flavoured and by no means inviting, the white when boiled being transparent and gelatinous, and the taste stronger than that of a duck-egg. Looms and loomerics were observed north of lat. 79° , at Cape Alexander. This species seems to replace our Guillemot in high

latitudes; the latter, apparently, does not occur at all in Greenland.

LITTLE AUK ("Rotch"), *Mergulus alle*.—A few Rotches were found breeding in Svarte Vogel Bay on July 16th, 1875. On the 25th they were very abundant at Cape York, lat. 76° , breeding amongst loose detritus at the base of high cliffs. Here the Esquimaux build little piles of stones in which these birds are induced to lay their eggs; these structures, and quantities of the birds' bones strewn about, gave evidence of the nature of these "Arctic Highlanders'" food, who were then chiefly away hunting. At this date the young birds were just leaving their nests for the water. On the 28th July, myriads of Little Auks were congregated about their chief breeding-place at Port Foulke. They were not in the least alarmed by visitors, and their incessant chattering as we scrambled down amongst them was deafening. They fly in such close bands as to obstruct the light at times, and settle down in such compact masses that, unless seen to alight, it would be impossible, even at a short gunshot range, to distinguish the crowd of birds from the rock on which they have settled. Foulke Fiord, lat. $78^{\circ} 18'$, is probably their most northern breeding-place. In 1876 I saw a few Little Auks on the 1st September at Cape Hawke, in lat. $79^{\circ} 30'$. The flesh of these birds was highly esteemed when made into a pie for the ward-room mess.

RAZORBILL, *Alca torda*.—A few pairs were breeding in Svarte Vogel Bay in July, 1875, when I obtained a couple of eggs. I met with no Razorbills north of this point.

CORMORANT, *Phalacrocorax carbo*.—I gathered a few eggs of the Cormorant with those of the last species, in lat. $69^{\circ} 42'$. There were from twenty to thirty pairs breeding at the cliffs near to the ridge overlooking the Itifdiarsuk Glacier.

LONG-TAILED DUCK, *Harelda glacialis*.—At Disco, lat. $69^{\circ} 14'$, a couple of pairs of this species were breeding by Blase Dalen Lake in the beginning of July, 1875. The parent birds were obtained, but I was unable to discover their nests. These ducks were very wary and, upon my first visit to the lake, would admit of no approach, keeping upon a central floating sheet of ice which was inaccessible, or flying out of range. Two days afterwards, however, I planned an expedition against them, and, having carried a "collapsible" boat to the spot, we shot them all. On

the 14th June, 1876, two Long-tailed Ducks were shot in Discovery Bay; a couple of pairs bred in the neighbourhood, but I could never find their nests, though the peculiarly deep "quawk" of the male often attracted me to the search. They appeared to be breeding inland, but at no great distance from the sea. Six were obtained in the vicinity of Discovery Bay.

EIDER DUCK, *Somateria mollissima*.—I have been obliged to omit several notes upon this and the following species, from not being certain to which they belonged. In the cases adduced the birds were, however, thoroughly distinguished. The Common Eider bred not uncommonly on Disco Island; both birds and eggs were obtained in July, 1875. On July 23rd a number of pairs were breeding on an island west of Kangitok, lat. $72^{\circ} 48'$. On the 30th July I shot two Eiders and obtained four eggs upon Brevoort Island, off Cape Sabine, in lat. $78^{\circ} 45'$. On August 4th there were many Eiders in Hayes Sound (Buchanan Straits), in lat. $78^{\circ} 52'$, and on the 11th old and young birds were frequent at Walrus Island, lat. $79^{\circ} 25'$. In Discovery Bay two Eiders were shot as late as the first week of September, 1875. In 1876 a couple of pairs were found breeding in Musk-ox Bay upon the 23rd June. Several were shot from that date on, and by the 8th and 9th August Eiders had gathered for migration in flocks of from twenty to thirty. On the homeward journey I observed several Eiders, the last seen being upon the 7th September at Walrus Island. Dr. Coppinger and Lieut. Beaumont obtained three of this species and saw several more in Polaris Bay in the month of July, 1876.

KING DUCK, *Somateria spectabilis*.—Several King Ducks were shot near Disco, lat. $69^{\circ} 14'$. Here they breed chiefly upon the mainland, from which I obtained their eggs. On the 3rd July, 1876, King Ducks were shot in Discovery Bay, and on the 16th, a female was shot whose breast was plucked bare. At the end of this month several of this species were seen and obtained upon Bellot Island, lat. $81^{\circ} 40'$. This species was, perhaps, commoner than the last in Discovery Bay; on the other hand, Dr. Coppinger considered the Common Eider the most plentiful of the two in Polaris Bay upon the opposite coast. Stomachs of both this and the last species examined were generally found to contain shrimps. Three King Ducks were obtained in Polaris Bay in July, 1876.

BRENT GOOSE, *Bernicla brenta*.—I first saw Brent Geese on the 7th June, 1876, in St. Patrick's Bay, lat. $81^{\circ} 48'$, when a pair came to breed. Numbers arrived in the following fortnight, feeding inland and frequenting muddy places by slushy torrents and ponds formed by the melting snow. Shoots of *Eriophorum*, *Ranunculus*, and *Cerastium* were the chief ingredients in their food. On the 24th June I found three nests in Musk-ox Valley; two had five eggs and one had two. Subsequently I found many nests; five eggs was their regular number, though they occasionally hatched two or three. The eggs of the Brent Goose are perfectly delicious eating. The nest consisted of a layer of a couple or three inches thick, of leaves, tops, and shoots of plants, placed on the open ground, with a bed of down above from the female's breast, which is plucked bare. By the beginning of July young Geese were on the water, and at the commencement of August they were easily knocked over in a half-fledged condition, while looking for food by muddy places near the sea. The female Brent Goose sits closely, the male keeping watch close by, and leaving when the visitor is about a hundred yards off; the female leaves when the nest is approached within ten or twenty yards, generally running instead of flying, although there is no means of concealment. It was a painful duty to shoot these, as well as other breeding birds, to supply our scurvy-stricken comrades with fresh food. The Brent Goose is, however, excellent eating, and was preferred on board H.M.S. 'Discovery' to all other Arctic game, and with us the term "game" included the entire list of birds and quadrupeds met with in Discovery Bay; even the Fox was highly appreciated. A few Brent Geese made their appearance in Polaris Bay, every one of which Dr. Coppinger informed me were shot for his invalids in July, 1876.

ROCK PTARMIGAN.—On page 128, I made a mistake in stating that Dr. Coppinger did not observe this bird at Polaris Bay. Upon referring to my game-list, I find that four were killed during July, 1876, by Lieut. Beaumont's party, to which Dr. Coppinger was attached.

ON THE EXTINCTION OF THE BEAVER IN LIVONIA.

FROM THE GERMAN OF OSKAR VON LOEWIS.*

IN the last century Beavers were not unfrequently found on many of the rivers of Livonia, especially on the Middle Aa. About 150 years ago they built in the north of Livonia, on the Pernau and its tributaries, and occasionally on the Embach, but especially in Central Livonia, on the Aa and in Sedde. They may also have occurred in Salis, and on the Duna and its tributaries, the Oger, Perse, and Erst, in the southern part of our province. We have it on the authority of Fischer, that colonies actually existed at that time. In his 'Versuch Einer Naturgeschichte Livlands,' 1871, he states, that in the year 1724 the Beaver-colonies built dams of great height, and thereby largely increased the inundations.

That the Beaver was formerly well-known in these parts is shown by the number of places in the Lettish part of Livonia that are named after it; for instance, the Beaverbeck and Beaver-court estates; again, Beaver-birchwood, Beaver-brook, Beaver-hill, &c. Bebris, or Beaver, is not uncommon as a surname among the Letts.

Until the end of the last century the inhabitants of Sedde supplied castoreum to the druggists at Fellin, and so late as 1830 it was obtained from Walk, in the Aa district. But, so far as my investigations have gone, since the year 1818 the Beaver seems to have frequented only the Middle Aa. Solitary individuals may perhaps have strayed into other parts, but this is doubtful, since the Aa district of Walk is the only place where there is positive evidence of their occurrence. And indeed this northernmost stretch of the Aa furnished the conditions best adapted for the protection and continued residence of this much-persecuted and defenceless animal. The stately River Aa here flows for more than fifty versts almost entirely through great lonely forests and occasional meadows; the five or six sparsely inhabited colonies and ferry-stations on the river bank cannot make head against the original wilderness. The shores of the swift-flowing, generally smooth-bottomed Aa, are composed of loose sand. Backwaters of great extent occur frequently; quiet pools; and here and there

* "Das Aussterben des Bibers in Livland," von Oskar v. Loewis. 'Der Zoologische Garten,' December, 1878. pp. 353-357.

the stream is divided by islands. At high tide these backwaters become united with the main stream. In time of flood the Aa inundates the district round for a verst or more, and forests meadows, pools, &c., are united into one vast lake. In former times the flooding of the river was no doubt greatly increased by the numerous Beaver-dams. Thus undisturbed, and with natural surroundings most favourable to their mode of life, the Beavers lived securely.

Many of the old inhabitants assured me, some years ago, that Beavers used, within their recollection, to appear frequently on the Luhde-Trikatenish Aa. They had themselves seen and hunted them, and had admired the felled trees, gnawed into conical points; the Beavers making use chiefly of the aspen, willow, lime, and maple.

In 1818 the ignorant peasants—poachers, in fact—used to sell the castoreum to the druggists at Walk for absurdly low prices; for example, the druggist Rücker, who is still living, paid for one loth (equal to half an ounce) of castoreum, one rouble, 27-28 copecks, silver money.*

But their doom was approaching with giant strides the happy Beavers of the Aa. The druggists of Dorpat, Wolmar, Fellin, &c., sent large orders to Walk at high prices. This encouraged the evil doing of the poacher—and at that time every peasant was one. Every man who could obtain a trap or a gun went, in his leisure time, to the woods by the romantically situated Aa. It was only possible to shoot the Beavers at night; and consequently whilst bad shots, with worse fire-arms, killed but few in the darkness, they nevertheless wounded a great many, and these died miserably and painfully in the wilderness, to the benefit of no one.

It seems almost incredible that not a single magistrate, land-owner, or other authority, should have taken notice of these senseless and barbarous doings; that no one should have put a stop to this wasteful massacre, this extermination of a creature already too rare. In the course of twelve years, through base love of gain and unheard of carelessness, even the few remaining Livonian Beavers were utterly destroyed. In 1832, after an interval of two years, the druggists at Walk received the last pair of castoreum-sacs from indigenous Beavers; the weight of this pair was twenty-two loth, and they realised fifteen roubles per loth.

* 100 copecks = 1 rouble = 3 shillings.

The owner had obtained them from a postilion at Stackeln, who had that year trapped the Beavers from which they were taken.

For some years these were believed to be the last representatives of the doomed race, until, in the autumn of 1840, on the estate of Neuhoſ, in the upper reaches of the Aa, east of Walk, a single Beaver was tracked and hunted, but without success. It had gnawed through strong willow trees, three or four inches thick, in the usual way, for its winter store of food. This Beaver disappeared from Neuhoſ, and fled from its eager pursuers yet farther up the stream towards the source of the Aa. At length, in the summer of 1841, on the borders of the crown-lands of Aa-hoſ, this sole surviving Beaver was shot by a gamekeeper, Neppert. It was veritably the last of its race, for since then diligent inquiry has revealed no traces of any Beavers in Livonia.

By consulting the account-books of the druggists, and noting the prices of castoreum, a thoughtful observer might have foretold the gradual destruction and final extinction of the Beavers. For example, at Fellin, the price of castoreum per ounce was, in 1776, 60 cop.; 1777, 1 r. 80 cop.; 1801, 3 r.; 1802, 3 r. 75 cop.; 1804, 4 r. 33 cop.; 1805, 5 r. 50 cop.; 1807, 5 r. 71 cop.; 1830, 14 r.; the supply constantly diminishing, until at length foreign or Siberian castoreum was worth forty roubles per ounce.

The demand failing, the high prices gradually fell, till in 1876 it was twelve roubles an ounce.

Strange to say, skins of the Livonian Beavers were not highly prized, and at most were only used by hatters; perhaps because the Beavers were almost always taken in summer, and the fur would not have attained its full beauty until the winter. The meat was utterly despised, and thrown away as unfit for use. Thus, neither fur nor flesh was the object of this deplorable destruction, the sole cause of which was the rapid rise in the value of castoreum, then held to be a necessary of life. Had this drug only been earlier replaced by the medicaments which subsequently came into use, the Beaver might to this day have been inhabiting Livonia, even though confined to one district, and protected by strict game-laws and the watchfulness of foresters and landowners. The Beaver is the first mammal of any size which has disappeared from the fauna of Livonia during the present century. Are the Bear, the Lynx, and the Squirrel to follow it before 1900?

OCCASIONAL NOTES.

WILD CAT IN THE WEST HIGHLANDS.—The Wild Cat, *Felis catus*, Linn., though yearly becoming rarer and rarer, is not extinct, I am glad to say, in Loch Aber. It is also occasionally met with in the districts of Arisaig, Moidart, Ardnamurchan [the last killed in Ardnamurchan was in June, 1872], Sunart, Ardgower, and Morven. It has also been met with in recent years in some parts of North Argyleshire, such as Upper Glen-creran and Glen Duror. It is usually encountered along the face of such rocky steeps as rise above broad beltings of natural woods, such as hazel, birch, &c. It is necessary to observe, however, that with keepers, fox-hunters, and others, all cats killed at a distance from human dwellings are called Wild Cats, though they may only be, as they frequently are, domestic cats that have for some reason taken to the woods and rocks, and become in a manner savage enough and wild enough, though not necessarily Wild Cats in the zoological sense of the term. Mr. Harvie Brown believes that, generally speaking, highland fox-hunters, gamekeepers, foresters, and shepherds, are perfectly conversant with the true Wild Cat; and few, except such as have never seen one alive, would commit the error of mistaking the one for the other. He has great trust in the reports regarding matters of local Natural History, because he has had considerable experience of their practical knowledge of the subject. Many of the highland keepers are good field-naturalists, and their opinions and statements are always worth consideration. Three years ago I saw a Wild Cat, a magnificent specimen, among the rocks in a place called the Dubh-ghlaic, or Black Gully. The fierce barking of my dog at a distance called me to see what was up, and there, on a narrow ledge of rock in the face of a giddy precipice, was a large Wild Cat, with eyes flashing fire, hair erect, and tail thick as my wrist and stiff as a poker, glaring down on my bitch "Lassie," who was baying it from a broader and lower ledge, into which, in her excitement, she had scrambled, and from which, on the disappearance of the cat at my approach, I had some difficulty in rescuing her. About a dozen years ago, a very large Wild Cat was killed in a curious way in my immediate neighbourhood. It was in the spring of the year. One of our crofters with his family had returned from gathering seaweed for manuring the land. Of the four panes in the cottage-window, one was of deal, and made to open and shut at pleasure on leather hinges, a very common arrangement for the purpose of ventilation, as well as for the convenience of the domestic cat when, from any cause, the door is kept shut. Looking through the opening on the occasion referred to, the man saw a strange cat of large size on the hearthstone, in the act of eating a chicken, one of an early spring brood that had been left with the hen by the fireside

when the family left for the seashore labours in the morning. Mackenzie, —such was the crofter's name,—ordering his family to fall back, armed himself with a bludgeon and entered the house by the door, in order to do battle with the cat. To prevent the cat from escaping through the open window, he directed his brother to watch the marauder at that not unlikely point of exit. Now the brother, a big, burly man, was the boat-carpenter of the district, and usually at daily work, though on this particular occasion assisting his brother in sea-ware gathering. The carpenter, be it understood, had on his everyday working trousers, originally of strong pilot cloth, and now all over, particularly about the knees and seat, so covered with layer upon layer of tar that it was stronger and thicker than any tarpaulin. When Mackenzie entered the kitchen and made a stroke at the cat, the latter made a dash at the open window-pane. The carpenter, in his excitement, could think of no better way to prevent the cat's exit than by placing that part of his body on which his trousers were thickest and baggiest right in the opening. The cat made such a vigorous dash at the opening that he got his head between the carpenter's legs, and further he could not get, though he struggled and clawed with all his might, for the carpenter now literally sat upon him, squeezing him firm and fast against the window-sill, which in such cottages is only about two feet from the ground. The well-tarred seat of the carpenter's trousers was strong and stout, as has been said, and it had need to be, for a wild cat's claws hard at work are no joke. The carpenter did not know himself how long they might afford sufficient protection, and he shouted lustily for immediate assistance. Mackenzie came rushing out of the door, bludgeon in hand, and dealt the cat stroke after stroke on the head, the granite window-sill acting as chopping-block, until the cat expired, and the carpenter could at last move away from the window-sill, thankful to have escaped with a few scratches of no great importance, considering how matters might have been had his unmentionables been of slighter and thinner texture. The carcase of this cat, a good deal mutilated by the energy of the bludgeon-work to which it had been subjected, I saw that same afternoon, and can bear witness that it was a veritable Wild Cat, of such monstrous size, too, that Mackenzie avowed that if the kitchen had not been so dark that he could only see the animal imperfectly, and was thus unaware of its hugeness, he never would have ventured a blow at it, and would only have been too glad to allow it to escape scot-free by any exit it chose. Upon the whole, then, a pretty safe conclusion is that, in the West Highland districts mentioned, Wild Cats, though not common, are far from being extinct.—ALEX. STEWART (Ballachulish Manse, Nether Lochaber).

PINE MARTEN IN CUMBERLAND.—A Marten-cat was sent to me on April 2nd, which had been trapped by a gamekeeper at the head of

Miterdale, a little valley running up towards Burnmoor, one of the loneliest and wildest parts of the district. It was an adult female Pine Marten, *Martes sylvatica*, not yet pregnant, measuring two feet three inches and a half from the nose to the tip of the tail. The breast-spot was white, with the faintest possible tinge of yellow at the centre. A Stoat was trapped in Murthwaite Wood, Gosforth, on March 1st, which was white, with the exception of the top of the head, back of the neck, and a faint line about a quarter of an inch broad running down the backbone. The tip of the tail was black as usual.—CHARLES A. PARKER (Gosforth, Carnforth).

WHITE-BEAKED DOLPHIN.—A young female of this species (*Delphinus albirostris*) was landed at Yarmouth on March 22nd from one of the herring-boats which had been fishing somewhere in the English Channel. The man who exhibited it in the Norwich Townland Fair, where I saw it, said, "off Cornwall," but was not very sure. In colour it very closely resembled the specimen recorded in 'The Zoologist' for 1879 (p. 421), but was rather larger, measuring in total length five feet, the other dimensions being in proportion.—T. SOUTHWELL (Norwich).

LONG-EARED OWLS IN GUERNSEY.—I have had several notes from correspondents in this island on the unusual number of Long-eared Owls which made their appearance there during the last autumn and winter. At first I thought there might be some mistake as to identity, and that the birds seen and shot were Short-eared Owls, which are always common there in the autumn. Accordingly I wrote to Mr. Jago, the birdstuffer at St. Peter's Port, to send me a skin of one of the owls of which he had had so many. He did so, and it turned out to be a Long-eared Owl, and with it he sent a note saying that Long-eared Owls had been very numerous that winter, and he had had many through his hands. He added, "The first I received was purchased by a lady in the market on November 8th, and a few days afterwards I received two from Herm; the following week I had nine brought to me. The Herm keeper shot two shortly after the first, and he then told me he could shoot a dozen any morning he liked. The last I received was shot on February 5th, making about thirty that have passed through my hands. I also know of many being killed that have not been brought to me." Undoubtedly this shows that a large migratory flock of Long-eared Owls visited the islands this winter, as the Long-eared Owl is usually by no means a common bird in the Channel Islands, and I was previously aware of the occurrence of few examples. Short-eared Owls, I believe, were seen in their usual numbers last autumn, Mr. Jago in his letter remarking that he had had about the usual number through his hands.—CECIL SMITH (Bishop's Lydeard, Taunton).

ICELAND GULL AND OTHER SEA-BIRDS IN WEST CUMBERLAND.—An immature Iceland Gull was shot near the mouth of the River Calder on February 20th last. It was a male, in its second year. The storms at the end of the month were very destructive to the smaller sea-birds. I myself picked up twenty Razorbills, eight Guillemots, and a Manx Shearwater in the course of a three miles' walk along the shore. I always find some of these birds dead in February; probably they are overtaken and drowned by storms when fatigued on their journey northwards.—CHARLES A. PARKER (Gosforth, Carnforth).

BLACK REDSTART IN CO. WATERFORD.—On March 26th a specimen of the Black Redstart was captured here within one mile of Waterford city. It is a young male bird, not having yet attained the full plumage, and is now in the possession of Dr. Burkitt, of Waterford, who added a specimen of this bird to his collection about forty years ago. I believe the occurrence of the Black Redstart in Ireland has not been often noticed.—E. A. WHITE (Summerville, Waterford).

[Several Irish specimens are mentioned by Thompson in his 'Birds of Ireland,' including the one in Dr. Burkitt's collection, which was shot near Wexford in February, 1836.—ED.]

VARIETY OF THE STARLING.—A hen Starling was shot in Gosforth parish on March 16th which had all the large tail-feathers and primaries of both wings of a dull white. The secondaries were tinged with very light brown and the whole body a dull brownish grey, the spots being very faint. The head was the darkest portion of the bird, but even that was much lighter-coloured than usual. Altogether it had quite a washed-out appearance.—CHARLES A. PARKER (Gosforth, Carnforth).

PEREGRINE FALCON IN BEDFORDSHIRE.—I regret to say a female Peregrine was shot in the neighbourhood of Bedford on April 3rd. Mr. Covington, the birdstuffer, showed it to me the following day, and, on dissection, I found the ovaries to contain eggs about the size of hemp-seed. It was, strange to say, like most of the Peregrines shot lately, exceedingly fat.—C. MATTHEW PRIOR (Bedford).

GREEN WOODPECKER IN SOMERSET.—I cannot agree with the editorial remark on this subject in the April number of 'The Zoologist' (p. 149), that the unusual number of Green Woodpeckers which have found their way into the shop of Mr. Petherick, the birdstuffer at Taunton, "seems to indicate a migratory movement towards the south-west on the part of this species." It seems to me to be perfectly accounted for by the late unusually hard winter, when there was but little work to be done on the

farm, or elsewhere out of doors, and no hunting; in fact, there was no outdoor work, and little or no outdoor amusement but skating or shooting. Consequently, many of those who did not skate wandered about with a gun, looking for snipe, or duck, or anything that might turn up; and the Green Woodpecker, being a fine, handsome, conspicuous bird, and easily shot, fell a victim to the numerous shooters, and, owing to its beauty, found its way to the birdstuffers in greater numbers than other less conspicuous victims. Had there been any large migration as suggested, more would have been seen about than has been the case. But the fact is, as might be supposed from the slaughter, I have seen fewer about than usual, and the numbers in the bird-shops seem greatly to have diminished the usual numbers of these handsome birds about us. I have not seen a single Green Woodpecker about my own place or in the neighbourhood during the whole of this winter and spring, and they are generally tolerably common just about here. There was a considerable destruction of these birds the winter before last, but not so great as during the past winter, when, as I have elsewhere remarked, this wholesale destruction of Green Woodpeckers almost threatened the extermination of the species, and made one wish that the provisions of the Bird Act might be extended to this particular bird throughout the whole year instead of during the close season only.—CECIL SMITH (Bishop's Lydeard, Taunton).

BITTERN IN WEST CUMBERLAND.—A Bittern was shot in the winter of 1873 on Sellafield Tarn, in Beekermeth parish. It had alighted amongst the bulrushes, and had it not been wantonly destroyed would probably have remained about the tarn, which is exactly the kind of place it would naturally haunt in company with the Coots and Mallards. Another was shot the following winter on the River Calder, about a quarter of a mile from the tarn. In 1876 a third was killed close to Wreay Castle, Windermere, by Mr. D. Ainsworth. A fourth, in 1879, was shot at Braystones Tarn, about a mile and a half from Sellafield. Some years ago a fifth was shot by Mr. Vickers, of Birkby Crag, as it flew over his yard in the dusk. It is a great pity that this beautiful and interesting bird is never allowed a chance of remaining where it would probably breed, were it not so uniformly persecuted.—CHARLES A. PARKER (Gosforth, Carnforth).

TESTACELLA HALIOTIDEA IN SUSSEX.—In his "Catalogue of the Land and Fresh-water Mollusca of Sussex" (Zool. 1878, p. 87), the Editor remarks:—"It is somewhat curious that none of the Sussex conchologists have included in their lists the Shell Slug, *Testacella haliotidea*, which is apparently not found on the chalk soil, or sand, although it is not very

uncommon on the London clay." I have now to report that it occurs plentifully in the nursery-gardens of Miss Allman, at Horsham, from whence, last autumn, I received many specimens of all ages.—WILLIAM BORRER (Cowfold, Sussex).

[Probably imported in earth adhering to the roots of plants.—ED.]

PROCEEDINGS OF SCIENTIFIC SOCIETIES.

LINNEAN SOCIETY OF LONDON.

March 4, 1880.—Prof. ALLMAN, F.R.S., President, in the chair.

The following gentlemen were elected Fellows of the Society:—S. M. Bairstow (Huddersfield), John T. Carrington (Aquarium, Westminster), Prof. P. M. Duncan (King's College, Lond.), R. M. Middleton, jun. (West Hartlepool), S. O. Ridley (British Museum), and J. Charters White (Belgrave Road, S.W.).

Mr. Middleton exhibited two skulls of *Babirussa alfurus*, Less., from Borneo, which, though quite adult, were both distinguished by the remarkable smallness of their tusks.

Dr. A. Günther brought forward two deep-sea fishes obtained during the 'Challenger' Expedition, viz. *Echiodon* and *Scopelus*, to illustrate two kinds of luminous metameric organs, first distinguished by Dr. Usson, which he described and designated as the "lenticular" and "glandular" kinds. Whilst admitting the great morphological resemblance of the former to an eye, he (Dr. Günther) gave reasons which induce him to dissent from the view that they are organs of vision. He showed that their structure is not opposed to the view that they, like the glandular kind, are producers of light, and that probably this production of luminosity or light is subject to the will of the fish.

Mr. J. Jenner Weir, on behalf of Mr. Edward A. Nevill, showed the stuffed head of a Prongbuck (*Antilocapra americana*), shot by the latter in the Rocky Mountains, August, 1876. On the median nasal region of this specimen what appeared to be a short unbranched third horn was developed. In the discussion which followed it was suggested that the abnormality in question might be an elongated warty growth rather than a true horn, after the type of the rear horns. A further careful examination into its structural conditions was recommended.

Dr. Francis Day next recounted the peculiarities and descanted on the geographical distribution of the Hebridal Argentine (*Argentina Hebridica*). Only three examples have hitherto been recorded (all by Yarrell) as taken in Britain, viz., two in Rothesay Bay, Scotland, and the third off Redcar,

Yorkshire. Dr. Day's fourth specimen was got off the Island of Skye. This Argentine, nevertheless, extends from Norway to the Mediterranean, being found in the latter all the year round, and is stated to be a deep-sea fish. Besides its rarity in British seas, a further interest is attached in the fact that Mr. Clarke has figured and described a new species, *A. decagon*, as inhabiting New Zealand; but his unique example, in all essential particulars, agrees with the European species. Has the latter, therefore, such a wide geographical range is a problem yet to be solved?

March 18.—Prof. ALLMAN, F.R.S., President, in the chair.

Messrs. W. Duckenfield Scott (Wimbledon) and Wardlaw Ramsay (Portsmouth) were elected Fellows of the Society.

The President said that before entering on the ordinary business of the meeting, it became his melancholy duty to announce the death of Professor Thomas Bell, at the age of eighty-seven. Prof. Bell was the oldest Fellow of the Society, having been elected into it in 1815. He had held the Presidential Chair for many years, and under his judicious and able guidance the Society had marvellously advanced in prosperity. He was a distinguished zoologist, and by his researches had largely advanced our knowledge of the Fauna of the British Isles. His labours have left their mark on the Zoology of Britain, and it is hard to say who can take his place in the department of Natural History in which he had shown himself so loving and conscientious an observer. He was known personally to many present, and by reputation to all of us, and the meeting will receive with sorrow the sad announcement that he has his place no longer among the Fellows.

There was exhibited, for Mr. John T. Carrington, a male and female example of the Northern Stone Crab (*Lithodes arctica*), which had lived in the Westminster Aquarium. The peculiar symmetry of the abdominal segments in the female was adverted to, and for this and other reasons an affinity with the Hermit Crabs pointed out.

In the absence of the author, the Secretary read a communication from Prof. Westwood, "On a supposed Polymorphic Butterfly from India." The author observed that when a species is connected with problems of biological interest,—such as modifications it may undergo through variations of food, of temperature, and of geographical distribution, or the possibility of two or more species being proved to be only dimorphic or polymorphic forms of a single species,—the investigation assumes a sufficiently widened interest to warrant ample discussion. Proceeding on this basis, he discussed the peculiarities of two supposed species of Lepidoptera, *Papilio Castor* and *P. Pollux*, from Assam and Silhet. He admitted that the variation in size and marking of the sexes of the same species of the genus *Papilio* is puzzling. As regards *P. Castor* and *P. Pollux*, he showed that authors are

by no means unanimous respecting them. Furthermore, that the question is rendered more complicated by the occurrence of a singular gynandromorphous specimen of *P. Pollux* in the collection of Mr. Semper, of Altona. From the evidence given, to admit the conclusion that *P. Castor* is the male of *P. Pollux*, as has been suggested, we should be obliged to admit not only that the female in this species is dimorphic, but also that the same thing occurs in the male. Taking all into consideration, Prof. Westwood summarises and is in favour, 1st, of *P. Castor* being males of a species whose females have not been discovered; 2nd, that the typical *P. Pollux* are females, of which the male with rounded hind wings having a diffused row of markings has yet to be discovered; and 3rd, that the coloured figures given by the author represent the two sexes of a dimorphic form of the species.

April 1, 1880.—Prof. ALLMAN, F.R.S., President, in the chair.

Only two short zoological papers were read, viz.:—"Description of a new Genus of Moth (*Pyramocera*) of the Family *Liparidæ* from Madagascar," by Mr. Arthur G. Butler; and "Notice of Marine Crustaceans collected by Mr. P. Geddes at Vera Cruz," by Mr. Edward J. Miers. The Vera Cruz Crustacea include—a female and immature male of a species of *Panopeus*; examples of *Pachygrapsus socius*, Stimpson, which is very probably merely a variety of *P. transversus*, as it is distinguished only by the absence of the dark patch on the immobile finger, which is always present in the typical *P. transversus*; and a series of females of a species of *Pinnotheres*, possibly the *P. angelicus* of Lockington.

April 15, 1880.—The Rev. G. HENSLOW, F.L.S., in the chair.

Mr. S. A. Wintle (of George Bay, Tasmania) was elected a Fellow of the Society.

The Secretary read a paper, for the Rev. R. Boog Watson, "On the Mollusca of the 'Challenger' Expedition" (part 5), in which the writer observed that temperature, even more than depth, seems an important condition in molluscan life, while both prove barriers to distribution, though great length of time naturally helps escape from these barriers. Where depth and temperature do not check distribution there is no limit to universality of distribution, and such is the case with certain existing species; still there is no trace of special, lasting and progressive change. Mr. Watson has described some thirty-five species, nearly all of which are new forms, and belong respectively to the families *Solenocoanchia*, *Trochida*, *Rissoellidæ*, *Littorinidæ* and *Cerithiidæ*.

Prof. F. Jeffrey Bell read a note on an abnormal (quadriradiate) specimen of *Amblypneustes formosus*, and afterwards Mr. Charles Stewart exhibited and made remarks on another but differently abnormal specimen of the same

species. Prof. Bell, after a full description, observed that, with more or less reason, some naturalists have looked on the possession of other than five rays as a character of some specific value among the *Asterida* and *Ophiurida*, and have considered that, on account of its greater rarity among the latter, it is of greater value as a mark of distinction; but such a view must be taken with considerable limitation. The pentamerous arrangement of parts in the regular *Echinoidea* is only disturbed in one example; information and specimens are, however, at hand to show how this may have happened. The rarity of any divergence from this five-part division, in face of the numerous variations which occur in other *Echinodermata*, will doubtless become more and more important as a factor in determining the genealogical history of the group.

A series of microscopical sections of pearls, exhibiting many irregularities in structural detail, were shown by Dr. Murie, and their several peculiarities explained.—J. MURIE.

ZOOLOGICAL SOCIETY OF LONDON.

March 16, 1880.—Dr. A. GUNTHER, F.R.S., Vice-President, in the chair.

The Secretary read a report on the additions that had been made to the Society's Menagerie during the month of February, and called special attention to several novelties, amongst which were two female Thars (*Capra jemlaica*), mother and young, presented by H.R.H. the Prince of Wales on the 5th February; and two Burrhel Wild Sheep (*Ovis burrhel*), purchased February 19th.

Mr. W. K. Parker exhibited and made remarks on the eggs and embryos of some Crocodiles (*Crocodylus palustris*), obtained in Ceylon by Dr. W. R. Kynsey, Principal Medical Officer of Colombo.

Mr. W. A. Forbes read a paper on some points in the anatomy of the Sumatran Rhinoceros.

Mr. Edward R. Alston exhibited and made remarks on a coloured drawing of an adolescent specimen of *Tapirus Dowi*, now in the Paris Museum.

Mr. Alston also exhibited a specimen of a remarkable and little-known Australian Marsupial, *Antechinomys lanigera* (Gould).

A communication was read from Mr. L. Taczanowski, giving the descriptions of a collection of birds made in Northern Peru by Mr. Stolzmann during the last months of 1878 and the first half of 1879. Amongst them were examples of three species believed to be new to science, and proposed to be called *Turdus maranonicus*, *Arremon nigriceps*, and *Colaptes Stolzmanni*.

Mr. Alfred E. Craven read descriptions of three new species of Land and Fresh-water Shells, from Nossi-Bé Island, N.W. Coast of Madagascar.

Mr. Craven also read a paper on a collection of Land and Fresh-water Shells, made during a short expedition to the Usambara Country, in Eastern Africa, with descriptions of seven new species.

Mr. F. Jeffrey Bell read some remarks in reference to certain statements made by Mr. A. Agassiz, in a paper on the synonymy of the *Echini*, communicated to the Society at a previous meeting.

Mr. W. K. Parker read a paper on the structure of the skull in the Chameleons.

April 6, 1880.—Prof. FLOWER, LL.D., F.R.S., President, in the chair.

The Secretary read some extracts from letters which he had received from Mr. W. A. Conklin, of New York, relating to the birth of an Elephant, which had lately taken place in a travelling menagerie at Philadelphia.

Prof. T. H. Huxley read a paper on the distinctive characters of the species of the genus *Canis*, as shown in certain points of the structure of their skulls and in the proportions of their teeth.

Dr Francis Day read a paper on the Fishes of Afghanistan, based principally upon a collection which had been made for him, in the highlands of Kelat and Quettah, by Dr. Duke.

A communication was read by Prof. Julius Von Haast, containing a description of a specimen of a rare Ziphioid Whale (*Epiodon novæ-zealandiæ*), which had been cast ashore at New Brighton, in July, 1878.—P. L. SCLATER, *Secretary*.

ENTOMOLOGICAL SOCIETY OF LONDON.

February 4, 1880.—J. W. DUNNING, M.A., F.L.S., Vice-President, in the chair.

The Secretary, on behalf of the President, nominated Mr. H. W. Bates, Mr. J. W. Dunning, and Mr. H. T. Stainton, Vice-Presidents for 1880.

Mr. Patrick F. Copland, of Hillcote, Buckhurst Hill, Essex, was ballotted for and elected a Member. Mr. John B. Bridgman, of 69, St. Giles Street, Norwich, and Mr. Peter Cowell, Librarian of the Free Public Library, William Brown Street, Liverpool, were ballotted for and elected Subscribers.

Mr. H. T. Stainton exhibited, on behalf of Mr. Grigg, of Bristol, a specimen of *Heliothis scutosa*, captured near Weston-super-Mare.

Mr. F. P. Pascoe exhibited a specimen of the common "fire-fly" of the Amazon Valley (*Aspisoma lineatum*), a species not mentioned by Messrs. Bates and Wallace. It has the usual intermittent light, flashing at intervals of about two seconds; but Mr. Pascoe believed, contrary to the general

opinion, that the insect was capable of withholding the light for an indefinite time, as he found that when alarmed they at once disappeared. Mr. Pascoe remarked that it would be very desirable that entomologists abroad should pay some attention to these "fire-flies"; they seem to vary in different localities. Mr. M'Lachlan had just told him that he had been informed when in Sydney that in the country to the north the "fire-fly" was a Dipterous insect.

The Rev. H. S. Gorham stated that the term "fire-fly" was applied to all luminous insects indiscriminately. In the district where Mr. Pascoe's specimen occurred there were perhaps fifty species of highly phosphorescent Coleoptera. With regard to our species, *Lampyris noctiluca*, he did not think that the insect had the power of suddenly withdrawing its light, having often handled and irritated them with a view to the experiment. He was of opinion that the light of the female *L. noctiluca* is certainly brighter when the insect is unimpregnated; after which it ceases to be so brilliant. Mr. Gorham believed that the so-called "flashing" was often simply due to the creature crawling over leaves and herbage, and thus exposing the ventral surface only at times.

Mr. M'Lachlan remarked that the subject of the simultaneous flashing of fire-flies had been brought under the notice of the Society in 1865 by the Rev. Hamlet Clark (see Proc. Ent. Soc., ser. iii., vol. ii., pp. 94, 101), and that he had at that time advanced the opinion that the phenomenon in question might be caused by currents of air inducing the insects to simultaneously change their direction of flight. He was of opinion that the common glow-worm was not capable of extinguishing its light when alarmed, as he had captured large numbers in a net at the same time, the insects nevertheless continuing to shine.

Mr. Osbert Salvin stated that in the Central American region he had observed that a luminous Elaterid, *Pyrophorus*, had a *straight* flight.

Sir Sidney Saunders stated that in the South of Europe (Corfu and Albania) the simultaneous flashing of *Luciola italica*, with intervals of complete darkness for some seconds, was constantly witnessed in the calm summer nights, when swarming myriads were to be seen far and near obeying this peculiar instinct of their race. He did not concur in the hypothesis propounded by Mr. M'Lachlan, that currents of air might induce a number of these insects simultaneously to change the direction of their flight, and thereby occasion a momentary concealment of their light, which would seem to imply a continuous luminosity, casually occulted; whereas the flashes are certainly intermittent, as shown by the difficulty experienced in capturing a specimen flying in the open, close at hand, when the flash becomes extinguished before the object can be attained, to be renewed for an instant at the distance of several feet. The simultaneous character of these corruscations, among vast swarms, would seem to depend upon an

intuitive impulse to emit their light at certain intervals as a protective influence, which intervals became assimilated to each other by imitative emulation. But whatever the inciting causes of the phenomenon, he affirmed that the fact itself was incontestable, and a frequent subject of remark by all observers there.

Mr. Jenner Weir said that he had noticed that when a glow-worm was captured, the light began gradually to diminish in intensity, but did not quite cease to be visible.

Mr. Meldola remarked that when in Ceylon, in 1875, he had captured numerous specimens of a Lampyrid (*Luciola vespertina*, Fab. = *Calophotia perplexa*, Walker), which was swarming everywhere over bushes and tall grass. The flight of the species was *straight*, and the insects did not fly in gregarious swarms. When captured and put in a box it gradually diminished the intensity of its light in the manner described by Mr. Weir, but if left undisturbed, was soon glowing with full brilliancy. Mr. Meldola observed, in conclusion, that the exact nature of the phosphorescence was still an unsolved problem, interesting both to the physicist and biologist. Some years ago he had examined the spectrum of the glow-worm, and found that it was continuous, being rich in blue and green rays, and comparatively poor in red and yellow.

Mr. Pascoe also exhibited the two sexes of *Isopogon hottentottus*, a Dipterous insect, which he was informed by Mr. R. W. Meade, of Bradford, had been hitherto unrecorded in this country. Above a dozen were seen gamboling in the air in a confined space among some yew trees at Box Hill, occasionally settling on the leaves. When he had taken four or five specimens the remainder, probably alarmed, disappeared. He remarked that the members of the family to which this fly belongs (*Asilidæ*) are generally solitary in their habits, alighting on the ground in some pathway or open spot, then darting off a short distance. They are perhaps the most daring and ferocious of all insects; they have even been known to pounce upon and carry off a tiger-beetle (*Cicindela*).

The Secretary exhibited, on behalf of Mr. George Francis, of Adelaide, specimens of a South Australian moth (*Anapaa*, sp.?), which feeds on the native *Eucalypti*. (See Proc. Ent. Soc. 1879, p. xv).

Mr. Meldola read the following note "On the Protective Attitude of the Caterpillar of the Lobster Moth":—

"Most entomologists have admitted that the grotesque attitude of those caterpillars forming Newman's 'Cuspidate' group was in some way protective, but it is only quite recently that Dr. Hermann Müller has made known ('Kosmos,' Nov. 1879, p. 123) the results of his observations on the caterpillar of *Stauropus Fagi*, which observations now for the first time tend to show the true meaning of this attitude in the species in question. When sitting on a twig in its natural position the head and first five segments

are held erect, and the greatly lengthened legs of the second and third segments held outstretched; thus, when seen from the front, the whole aspect of the insect, both in form and colour, is most spider-like, and when alarmed it immediately raises its four long legs and moves them irregularly, after the manner of a spider attacking its victim. This spider-like appearance is believed to be a special protection against ichneumons which may approach it from the front. According to the experience of H. Müller ichneumons are especially afraid of spiders, and he states, on the authority of Fleddermann, an experienced breeder of insects, that the larva of *S. Fagi* was never found to be attacked by ichneumons, whilst, according to Treitschke, the nearly allied *Hypocampa Milhauseri* is often attacked by them, although a much rarer species, which rarity may perhaps be attributable to the complete absence of such protection as that possessed by *Stauropus Fagi*. When approached from the rear there is nothing to be seen but the erect, hard, shield-like surface of the last segment surmounted by two black horns, and presenting an appearance totally unlike that of a caterpillar. When a side-view of the larva is presented there is seen on the fourth and fifth segments a small black depression just below the spiracles, and giving the appearance of a caterpillar *which has already been stung by an ichneumon*, so that one of these foes approaching from the side would be deceived and abandon it without depositing its eggs."

Mr. S. Stevens stated that, having recently reared several specimens of *S. Fagi*, he could confirm the opinion of Dr. H. Müller as to the spider-like appearance of the larva.

The Rev. H. S. Gorham communicated a continuation of his "Materials for a Revision of the *Lampyridæ*," the present paper treating of the genus *Photinus*; and Dr. Sharp communicated a paper entitled "On some Coleoptera from the Hawaiian Islands."

March 3, 1880.—H. T. STANTON, F.R.S., &c., Vice-President, in the chair.

Dr. Henry Charles Laug, of 41, Berners Street, Oxford Street, and Mr. Frank Crosbie, of The Chestnuts, Barnet, Herts, were ballotted for and elected Ordinary Members.

Mr. F. P. Pascoe exhibited several species of scorpions *à propos* of a controversy which has recently been going on in 'Nature,' respecting a statement that scorpions are in the habit of stinging themselves to death when in the midst of a circle of fire from which they are unable to escape. He pointed out that the two common European species, *Scorpio europæus* and *Buthus occitanus*, were almost physically incapable of reaching a vital part owing to the shortness of the tail or post-abdomen, and thought there must be some error of observation with those who asserted the contrary. From his own experience, he believed that scorpions were only

able to strike backwards and a little upwards. In some forms with very long tails, such as *Lychas*, &c., it might be quite possible for the animal to insert its "sting" into the soft parts between the segments; but he thought it was questionable whether, in this mild way, any poisonous matter would be ejected. Another difficulty was that when the tail was so bent back the convexity of the sting would be downwards, and consequently its point would be upwards and away from the cephalothorax.

Mr. S. Stevens exhibited, on behalf of Mr. Pim (who was present as a visitor), a dwarfed female specimen of *Plebeius Icarus* (*Lycana Alexis*).

The Rev. A. E. Eaton exhibited three plates of drawings of *Ephemeridæ*, showing the structural details of the species represented.

The Secretary exhibited, on behalf of Mr. George Francis, of Adelaide, the microscopical specimens referred to at the last meeting, which had been kindly mounted for exhibition by Mr. William Cole.

Mr. Howard Vaughan exhibited a series of *Cidaria russata* from Yorkshire and the Isle of Arran, showing the local variation of this species.

The Rev. H. S. Gorham read a paper on the *Lampyridæ*, in continuation of those communicated at the meetings of December and February last, the present instalment concluding his revision of the genus *Photinus*.

Mr. Gorham also read a paper summing up the results of his observations on the *Lampyridæ*, with respect to their phosphorescence, which he believed to serve the part of a beacon for attracting the sexes to one another. In support of this conclusion he stated that he had found that the eyes of these species were developed in magnitude according to the amount of luminosity displayed. With regard to the typical species of the family, he had observed that in the most highly organized genera, such as *Lamprocera* and *Cladodes*, the light-emitting faculty did not appear to be developed in proportion with the rest of the organs, and that the eyes were also reduced "in a direct ratio with the light," being small and uniform in both sexes, whilst the antennæ were "developed in inverse ratio as the phosphorescence is diminished." In illustration of this supposed correlation between the development of the antennæ and the intensity of the light, Mr. Gorham exhibited a selection of species arranged in three groups.

Mr. Pascoe thought it was much to be regretted that Mr. Gorham had not been able to observe the phosphorescence of some of the exotic *Lampyridæ* in their native haunts, as he had no doubt that many of the opinions now advanced would thus have to be considerably modified.

Sir Sidney Saunders observed that the discussion involved two distinct questions,—namely, the flashing at intervals and the simultaneous action of large numbers in displaying their luminosity,—both of which he considered as indisputable facts. As regards the first, he mentioned the circumstance that when flying past, free from all obstructions, the *Luciola* suddenly emits its light, and then remains untraceable until it repeats its flash at a

distance of some yards, and is therefore difficult to capture unless by overtaking the fugitives and sweeping with a net in the observed direction. They then exhibit a casual glare as they crawl about within. As to the contemporaneous flashes of myriads, such as are more frequently congregated on the calmest nights, surrounding objects, previously involved in obscurity, become suddenly illuminated as if by electricity, and as rapidly plunged in their antecedent gloom at alternate intervals. He could not concur in the hypothesis that currents of air had any connexion with such displays or occultations, when not a breath was stirring around; nor that these manifestations might be evoked by sexual influences, amid vast hosts instigated to combine therein and act in unison. He would rather attribute this phenomenon to an inherent tendency to emit their light from time to time, requiring a certain period of repose to recruit their powers; and when any thus surcharged felt intuitively inspired to take the initiative, the others—prompted to obey a corresponding impulse—followed such example in responsive sequence. He confirmed Mr. Gorham's remarks as to the luminous segments of the abdomen being diaphanous and recognizable, adding that their luminosity was retractile and of a quivering character, with alternations of a golden lustre, differing from the phases exhibited when disporting in mid-air.

The Rev. A. E. Eaton remarked that while the subject of insect luminosity was under discussion, it might be interesting to mention that Dr. Hagen, in a paper published in the 'Transactions' of the Society for 1873 (p. 399), had stated that a species of *Ephemeridæ* (*Cænis dimidiata*) had been sent to him by Prof. Zaddach as a luminous insect, two males having been captured at night near Pillau "giving a small blue light."

Mr. Meldola stated that Mr. Thomas Belt, in his well-known 'Naturalist in Nicaragua' (p. 320), had expressed his belief that the luminosity of the *Lampyridæ* played the same part as the bright colours of many caterpillars, i. e., that it served as a danger signal, warning nocturnal foes of the inedibility of the species of this family, which he had found to be generally distasteful to birds, &c. Their immunity from persecution is also testified by the fact that the species of this family are very frequently mimicked by other beetles, and even by insects of other orders.

Mr. C. M. Wakefield communicated a paper by Mr. R. W. Fereday, entitled "Description of a new Species of the Family *Leucanidæ* and a new Species of the Genus *Chlenias*"; Mr. A. G. Butler communicated a paper "On Synonyms of Heterocerous Lepidoptera"; Mr. C. O. Waterhouse communicated "Descriptions of *Cetoniidæ* and *Cerambycidæ* from Madagascar." —R. MELDOLA, *Hon. Sec.*

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THE BEAVER IN NORWAY.

BY ALFRED HENEAGE COCKS, F.Z.S.

LITTLE or no accurate information is forthcoming about the present distribution of Beavers in Norway. Lilljeborg, in 'Sveriges och Norges Däggdjuren,' published in 1874, enters at some length—about $2\frac{1}{2}$ large 8vo pages—into the question, both as regards Norway and Sweden, and quotes from Nilsson's 'Skandinavisk Fauna' and from the 'Svenska Jägareförbundets Nya Tidskrift,' volumes for 1865, 1867, 1869, 1870, and from an article by Mr. Robert Collett in the next volume. Beyond the information supplied by these Scandinavian writers, I know of no tolerable account of the distribution of the Beaver in the Scandinavian peninsula.

Blasius, in his 'Säugethiere Deutschlands,' published in 1857, says, with great recklessness (p. 407), "In Lithuania and Poland, Norway, Sweden, and North Russia, they are, however, existing in great abundance (*häufiger*)."
Giebel, in 'Die Säugethiere,' published two years later, says in nearly the same words (p. 619), "In Norway and Sweden, Poland and Russia, on the contrary [it is found] abundantly" (*häufiger* being again the word used). It is fair, however, to state that until about twenty-five years ago Beavers were apparently much more widely distributed over Scandinavia than at present. I was told last autumn that it is about twenty-five years since the last Beaver was killed in the neighbourhood of the Osterdal, Norway, in the Slem Aa, a tributary of the Rena Elv; and Lilljeborg (p. 362) quotes to the same

effect from Hallgren (*Svensk. Jäg. Nya Tidskrift*, 1869, p. 52), that "twenty to thirty years ago it was found commonly in all fjeld districts; beaver huts and dams are still not rare by water-courses in the fjeld districts." The former existence of this animal to the west of the parish of Lom, Gudbrandsdalen, Norway, is shown by the names "Bøeverdal" and "Bøvertun Sæter." I am not aware of any book in English which gives any information on the subject.*

On July 24, 1877, I visited by boat a beaver-lodge at S——,† the only one near the house where, by the kindness of Mr. G., the owner of the land, I was staying. This lodge being of old construction, it was difficult to make out exactly how much of it was really the work of the Beaver, all one could see being a few holes in the bank of a large island of several acres extent in the middle of the river. I believe, however, the state of affairs is this:—A pair of Beavers make a house of logs and sticks at the side of an island, and by degrees, in the floods, earth gets washed all over it and trees grow on it, so that it eventually gets joined on to, and made part and parcel of, the island, making it almost impossible to tell how much is natural.

We found plenty of Beavers' "runs" from the water well up on to the island, and plenty of tracks, which, considering it had rained hard all the previous night, could hardly have been older than that morning. There were also plenty of twigs lying about which they had bitten off the trees, and an alder cut down by them, about as big round as the lower end of one's thigh. Altogether there was a great deal of work for two animals, the only two, it was said, in that immediate neighbourhood. At one place at the bottom of the water could be seen a large accumulation of barked branches, which I was told was the remains of an old lodge. My knowledge of Norse was at that period very limited; but if I understood rightly, the Beavers construct lodges of branches each spring, which are sooner or later in the season destroyed by the timber, which, when felled,—according to custom in Norwegian forests,—is dragged to the nearest point

* Some brief remarks on the subject will be found in Bowden's 'Naturalist in Norway.'—Ed.

† I shall, I hope, be excused for not giving in full the names of the localities. The first alluded to, however, is the well-known Beaver colony mentioned by Lilljeborg.

of the river, and left to find its way down to the coast. Naturally, when a few logs get together, they carry all before them, not even sparing so interesting an object as a Beaver's lodge. To this cause was attributed the non-increase of the animals. I had intended to go up again in the boat that night, to wait out in the hope of seeing something of the Beavers themselves; but the night was so pitch-dark and overcast that it was useless to attempt it. The next morning I went up the river again by boat, and saw some lodges at some little distance from that inspected the previous day, which were inhabited, I was told, by two pairs of Beavers.

There were said to be ten inhabited lodges—*i. e.*, ten pairs of Beavers—about seven English miles lower down the river, making (if I understood correctly), together with the three pairs whose lodges I visited, a total of twenty-six Beavers in this river.* We found a birch tree cut down where it was about seven inches in diameter, at a height of five feet eight or nine inches from the ground. This must have been done, I suppose, when the snow lay some little depth.

Last year while in Norway I heard of a new Beaver "colony," which had been noticed the previous year (1878) for the first time near P——, in a small river, the R—— Bæk. On visiting the spot, I found that the Beaver or Beavers (it is not known which) lived in the river-bank, to which there was access by two holes, like magnified water-voles' holes, close together, just above the surface of the water. The bank on that side of the stream rose steeply to a height of about twenty feet, and was thickly wooded; but it seemed an unlikely place for Beavers to take up their abode in, as the stream was only a "beck," quite narrow, and the opposite bank was flat meadow land, forming part of a regular farm, the house not being much more than a quarter of an English mile distant, and it was altogether quite a tame locality. The owner of the farm showed me where the original holes had been on the meadow side of the Bæk, which he had stopped up for fear of his cows breaking through. In one of them, he said, he had found a small fish, which he was fully

* It is, of course, natural to suppose that each—or at least most—of these thirteen pairs would have young at the time of my visit; but as I was particularly told that the numbers do not increase, but rather the reverse, it would not do to allow for them in endeavouring to make out a census.

persuaded had been brought in by a Beaver for food! He seemed anxious to shoot them on account of the amount of wood they destroy, although all the wood being on the opposite bank of the beck, and therefore not on his land, that could not much matter to him. I did my best to impress him with the idea of their rarity and interest, but failed to enlist his sympathies. On the opposite side plenty of their work might be seen; dozens of trees cut down over some width of ground, and plenty of "runs" up the bank. I found a birch tree thirty-six inches in circumference cut down by them. The actual cut was about eighteen inches long, the bark being taken off for over two feet. Another tree which they had cut down was twenty-nine inches in circumference, and a third twenty-eight inches.

The Beaver or Beavers, it seems, came here in the summer of 1878, probably (the farmer told me) in June or July, and appear to have migrated from a place (T——), about twenty-four English miles as the crow flies, where, I was told, on what I believe to be unquestionable authority, a colony still exists, but I could learn nothing about its numbers, and had not time to go there to see for myself. I have also heard of the probable existence of a fourth colony in Norway (S——), and I hope and believe it is not unlikely that another small colony or two may yet exist in that country, and also perhaps in Sweden.

That this animal, however, is very rare is sufficiently proved by the fact that the skeleton is a desideratum, I believe, in all the Scandinavian Museums,—I think Lund has an imperfect example,—although they all have old stuffed skins, in each instance, I think, from S——, the place here first mentioned.

ON THE RECENT OCCURRENCE OF THE PINE MARTEN IN LINCOLNSHIRE.

BY JOHN CORDEAUX.

IN addition to the captures, in this county, of the Pine Marten already recorded, I have notes of several other occurrences, an enumeration of which may interest zoologists. I am also in possession of information from correspondents, and orally, which leave it beyond doubt that the Marten, although becoming scarce, is still to be found in certain haunts both in North and Mid-Lincolnshire. As it is probable any mention of its present habitats would only tend to hasten the extinction of the species, I must be excused for not mentioning the exact localities where it may still be found.

It is satisfactory, however, to know that as there seems an increasing disposition, in some cases, on the part of our large landed proprietors rather to preserve than exterminate, we may hope that many years will elapse before we hear of the death of the last Lincolnshire Marten. That it has not become extinct is due to the comparatively undisturbed nature of its old haunts. Had the preservation of game been carried to the same excess which we know to be the case in other counties, it would probably long ere this have disappeared along with the Badger and Otter, Buzzard and Hobby, which, although few and far between, still linger on—the last representatives of the old Lincolnshire fauna.

There are great woodlands in Mid-Lincolnshire, and wild and secluded valleys amidst the wolds, distant from any railroad, where, unless we except a higher cultivation, the natural features have continued much what they are since the Saxon and Danish invasions. A friend, a great lover of our county, recently sent me some lines descriptive of one of these secluded spots in the heart of the wolds. They are so true to nature that I venture to quote some portion:—

“ 'Tis hither many an exile flies
Before the march of man ;
Here many a bird and beast defies
Grim cultivation's ban ;

'Tis here by night the Wild Cats prowls,*

'Tis here the Badger hides ;

Here flits at eve the horned Owl,

And Hobby fearless bides.

“ 'Tis here I've seen the Buzzard swoop,

Where roams the tender brood ;

'Tis hither Geese in legions troop

From distant seas for food ;

'Tis here the Wild Swan's note is caught

Soft on the frost-clear air,

And here the Marten-cat has sought

A last precarious lair.”

When the Dane, discarding his piratical life, turned peaceful colonist, there arose on the wold slope many a lonely “bye” between the forest land below and the rolling down above—downs quite unenclosed, and covered with a thin coat of ragged turf, interspersed with patches of yellow gorse or purple heather, or rough with the coarse tussocks of the barren brome grass. In these days the Marten must have been a very common denizen of our Lincolnshire woodlands, and there can be no doubt that the few which remain are descendants of a very ancient race indigenous to the county long before Saxon or Dane, Roman or Coritani were heard of.† Gone are the ancient pine forests, not a relic left; gone also are the great woodlands of beech and oak; gone are the fenlands, beautiful after their kind in plant and animal life; gone the wide waste of the wold, the home of the Bustard and Stone Curlew; fen and wold alike now brought to the highest perfection of culture; and yet amid all these changes, and in spite of centuries of persecution, the little Marten-cat has succeeded in holding its own—a striking instance of the survival of some species under the most adverse circumstances.

Recent notices of the Pine Marten in Lincolnshire already put on record are as follows:—

In ‘The Naturalist,’ vol. v., 1855, Mr. John Brown, at that time taxidermist at Louth, states that on the 6th November,

* There are cats in some of the great woodlands of Lincolnshire that have for generations bred wild. They are said to be much broader in the head and shorter in the tail than the domestic race from which they have sprung.

† To the Saxons the Marten was familiar as the *Mearth*, or *Merth*, to distinguish it from the *Fäl-merth*, Foulmart, in contradistinction to which we find the form still known as the Sweetmart in the wilds of Cumberland.

1854, he had a fine specimen of the Pine Marten brought to him for preservation, caught the previous day in a trap on the estate of Capt. Fox, of Girsby, about seven miles from Louth. He also mentions a second example, on the authority of the Rev. George Jackson, of Reston, taken some years previously in Burwell Wood, about four miles from Louth.

In 1865 one was trapped in a plantation at Riby, near Grimsby, on Col. Tomline's estate, as recorded by me in 'The Zoologist' for 1866 (p. 242); another had been trapped in the same locality a short time previously.

One is recorded in the same Journal for 1877 (p. 251) by the Rev. A. P. Morres, shot in the South Wood, at Stainfield, near Wragby, in the winter of 1871-72. This wood is five hundred acres in extent, and was known formerly as a famous haunt of the Marten-cat.

Again, in 'The Zoologist' for 1879 (p. 420), a female Marten-cat is stated to have been trapped in that year on the property of Mr. Rowland Winn, at Appleby, near Brigg.

So far as I am aware, these comprise all the recent occurrences on record of the Marten in Lincolnshire, in addition to which I have the following notes:—

In 1858 a Marten was caught in Well Wood, near Alford; this came into the possession of Mr. Hibbert, innkeeper, of that place, who subsequently put it into a sale. I have not been able to trace it beyond Mr. Hibbert's possession.

In the winter of 1874 one was trapped in a plantation called the "Suscoms," on the hillside at Worlaby, near Louth. The stuffed skin is now in the house of Mr. Alders, of Worlaby. This specimen was thought to be a wanderer from Burwell Wood, at no great distance. This wood, one of 400 to 500 acres, is of great antiquity, a remnant of that forest belt which at the time of the Danish settlement fringed both the northern and southern slopes of the wolds from Spilsby to Barton-on-Humber. I am told that up to 1874 or 1875 the Pine Marten had occasionally been found in Burwell Wood. A correspondent has told me that seven or eight years ago he trapped three Martens near * * * Wood, and says that at the present time he knows where there are a few left, and hopes this spring to be able to get some young ones from the nest to be reared as pets. Subsequently he told me of two other localities where the Marten may be found.

I have an extract taken from the diary of an old sportsman, still living, in his day as good a man as ever crossed Lincolnshire:—"March 23, 1825. Met Sir Richard Sutton's hounds (the Burton) at Newbold Common, near Wragby. Found and ran into a Marten-cat." I have been told of a similar case when some years since the hounds ran down a Marten in Tumby Wood, near Horncastle, the little animal never attempting taking to a tree, but was fairly "run into."

Mr. Adrian, of Lincoln, recently told me that nineteen years ago, during the April Fair week, in one of his bird-nesting excursions, he was passing through Branston Booths Wood. There was a very large oak tree, the trunk and lower branches of which were completely shrouded in woodbine, forming a dense bushy retreat. On striking this, a Marten dashed out and was instantly at the tree top, where it sat behind a branch, with outstretched neck, peering down and intently watching every motion. His first shot cut the branch in two, and brought the Marten tumbling through the tree, wildly clutching at the branches and endeavouring to gain a fresh foothold. It struck the ground with such force that Mr. Adrian thought all life must be knocked out of it; but no such thing, the little animal was off in an instant through the dense undergrowth. Borrowing a farmer's dog, he shortly returned to the place, and after a most exciting hunt succeeded in tracking it to a high tree on the opposite side of the wood, where a second shot and a worry from the dog ended its career. It was a fine old male, and the only Marten this indefatigable naturalist has seen alive during his many wanderings in our Lincolnshire woodlands. On May 7th, 1870, he had a Marten-cat sent him for preservation, taken in a wood near Horncastle; and in the spring of 1874 received four old ones, all from the same locality—a wood near Bardney. About four years ago he bought one from a carrier which was captured near Wragby. Since this he has only had one example, but neglected at the time to make a note of the locality and date.

Since writing the above I have received further notes of occurrences of the Marten-cat in Lincolnshire extending over twenty years, the most recent relating to one captured about a year ago on the estate of Mr. Heneage, at Hainton, near Wragby. I may add that in every case in which I have

had an opportunity of examining the skins of Lincolnshire Martens they have belonged to the yellow-breasted species, *Martes abietum*.

This, for the present, must close my notice of Lincolnshire Martens.

[The colour of the breast, it would seem, cannot now be relied upon as a mark of specific distinction, *cf.* 'Zoologist,' 1879, p. 441. It is very desirable that wherever practicable the dental characters pointed out by Mr. Alston should be looked for and reported.—Ed.]

ORNITHOLOGICAL NOTES FROM NORTH LANCASHIRE.

By W. A. DURNFORD.

THE following notes, made during the last twelve months, though they contain no startling announcements of the occurrence of new or rare species, and must, I fear, be termed rather commonplace, may possibly prove of interest to some of the readers of 'The Zoologist.'

The year 1879, in this as in most other parts of England, was a most disastrous one for the birds, and we can only hope that it will be long before we experience a similar season. The intense severity of the winter of 1878-9, followed by a wet and inclement summer, told its tale even on the shore-birds and wildfowl, though these were naturally far less affected by the weather than the inland species; and even if the winter we have just passed through cannot be said to have rivalled in severity its immediate predecessor, yet the average temperature was considerably below that of other seasons, and the mortality amongst the weaker varieties of birds has been very considerable. It is rather remarkable that the birds which seem to have suffered most are some of those which hail from more northern regions than our own, and might be expected to be able to withstand a large amount of cold, *viz.*, Fieldfares and Redwings. The latter in particular were terribly affected by the frost, and during January and February I came across numbers either dead or so weak as to be scarcely able to fly. Blackbirds and Thrushes, as well as Finches and other small birds, also fell victims in large numbers to the inclemency of the season, and such was the devastation created

in the more exposed portions of the district that on several occasions last winter, during a walk of ten miles amongst the fields and lanes of Walney Island,—where small birds as a rule are fairly plentiful,—with the exception of the semi-domestic Sparrow, I did not meet with a perching bird of any description, all having either perished or migrated to more sheltered regions. At the same time Larks, Starlings and Finches, and even an occasional Rook, might be seen searching for food amongst the snow in our leading thoroughfares; whilst in the adjoining shops the poulterers exhibited for sale unusual quantities of half-starved Ducks, Plovers, Snipe, Woodcocks, and small birds of all sorts.

In the midst of such wholesale destruction it is pleasant to be able to record that in no previous winter, to the best of my belief, has the system of throwing out a daily supply of scraps, for the benefit of the hungry birds, been so widely adopted by the occupiers of country houses in this neighbourhood as during the past season; and I feel sure that to this cause alone may be attributed the preservation of hundreds of our feathered friends. On February 20th I happened to be present at one of these bird banquets, and could not help being amazed at the way in which the various species came flying in from all quarters as soon as the food was thrown out. The Rooks, in particular, created much amusement by the longing and yet undecided manner in which they eyed the feast from afar, half afraid to approach, until, their appetites overcoming their shyness, they would make a sudden dash and carry off the largest lump of bread which they could seize to a place of safety. On the other hand, the Tits exhibited extraordinary boldness, caring apparently for no one, and showing a partiality for old bones and fragments of meat.

Partridges in this neighbourhood did better last spring than was the case farther south, owing probably to the fact of their nesting, as a rule, on high ground out of reach of floods; numbers, however, fell victims to the frost, and it will take some years to make up the loss. Grouse do not appear to have suffered at all, and Pheasants—thanks chiefly to the artificial protection afforded them—did not take much harm.

Taking my notes in chronological order, I find that one of the first entries for the year 1879 relates to Windermere Lake. During the latter portion of January this magnificent sheet of water was frozen over from end to end, and skaters were able to

enjoy the unusual and pleasurable excitement afforded by a ten-mile spin without a break (the ferry excepted), amidst some of the finest scenery which our island affords. As might be expected, the wildfowl, which are generally to be found upon the lake, were considerably inconvenienced by the ice, and were under the necessity of confining themselves to the small pieces of open water which, from some unknown cause, always exist on Windermere, no matter how severe the winter may be. For some days one of these open spaces was frequented by a flock of Wild Swans; and on one occasion, by keeping under the shelter of a rocky islet which lies off the mouth of Cunsey Beck, I was able to skate up to within twenty yards of a flock of Widgeon which were peacefully disporting themselves in a hole in the ice, which, sad to relate, had been made by two unfortunate men who had been drowned there the previous day. Several other species of Duck frequented the lower lake, and on the 25th I saw a couple of Little Grebes diving about near Belle Grange in a patch of open water which was frozen over the same evening. All the other wildfowl were, however, far outnumbered by the Coots, and a more amusing sight could scarcely be imagined than a flock of these ungainly birds sprawling over the ice, vainly endeavouring to make their way across the glassy surface in their search for open water and fresh feeding grounds.

Throughout February and March the cold still continued with more or less severity, and on the 22nd of the latter month the ice on a tarn up in the hills showed no signs whatever of giving way. Nevertheless evidences of spring were at hand. On March 10th, considerably later than usual, the Black-headed Gulls had donned their summer plumage; by the same date numbers of Chaffinches, all cock birds, had reached their summer quarters. On the 16th the Rooks were building at Furness Abbey, and the Jackdaws were taking a preliminary survey of their nesting-places amongst the venerable ruins; whilst, ten days later, as already recorded in 'The Zoologist' (1879, p. 488), a Raven's nest was found, and, I regret to add, five eggs on the point of hatching were taken amongst the rocky slopes of Skiddaw.

Notwithstanding, too, the weather, the summer migrants appeared with their accustomed regularity and in fair numbers. The first two Swallows were observed at Barrow on April 12th; two days later a Wheatear had found its way to Walney Island.

On the 25th the Cuckoo was calling vigorously at Kirkby, and was followed on the 29th by the Landrail, the latter being unusually abundant last summer in this district. During the last week in April considerable interest was created by a Blackbird which frequented a wood about four miles from Barrow, and which was in the habit of amusing itself and all who heard it by imitating, with amazing accuracy, the crowing of a bantam cock.

Paying a visit to Walney Island on May 10th, I found the sandhills at the south end well occupied by their summer tenants. The Black-headed Gulls, a fresh colony of which was established this spring, had just commenced laying, as had also two or three pairs of Oystercatchers, whilst the Ringed Plovers had been already sitting for some time. Stock Doves were more plentiful than usual, and one had that morning been captured by the watcher on its nest in a rabbit-hole. Altogether I counted six or seven pairs on this occasion, and found three nests, two of which were quite out of reach. About a dozen Sheldrakes were hanging about the warren and adjoining shore, but I could not ascertain whether they had yet laid. On May 17th I again visited the island, which I need scarcely remark possesses an irresistible attraction for the ornithologist, and had the pleasure of finding, by the merest chance, a Sheldrake's nest containing sixteen eggs. I was attracted to the hole by a white feather lying on the sand, and found the nest within three feet of the entrance, the eggs being deposited in a most delicious bed of down. As the old birds were flying round in a state of great anxiety, I did not stop long in the locality. I was rather surprised to-day at observing a flock of not less than three hundred Oystercatchers standing together on a sandbank, and taking apparently no interest in their companions, which were engaged in nidification close by. Dunlins, in full summer plumage, were also fairly common. At the same time, amongst the numerous Terns which were wheeling about overhead, and which had not yet laid, I was glad to be able to distinguish at least three pairs of Sandwich Terns (*Sterna cantiaea*), a species which hitherto has not been known to breed at this end of the island, but a colony of which exists at the north end, about six miles distant. It was not, however, until the following Saturday (May 25th) that I was shown two nests of this bird, each containing a couple of eggs, which had been first discovered by some boys from a neighbouring farm. The name given by the watcher

to these interesting visitors—which will, I trust, increase and multiply in their new home—was, as near as I could make out, “Kirk-” or “Kek-Swallows.”

June 7th found me on the Cumberland coast, a few miles south of St. Bees Head. Here, as on Walney Island, Black-headed Gulls, Common and Lesser Terns, Oystercatchers, and Ringed Plovers, as well as Stock Doves, Wheatears, and Pipits, were as numerous as in previous years. A few Snipe were also nesting in a neighbouring marsh. It is perhaps worth noticing that whilst the nests of the Common Tern were scattered about all over the sandhills and adjoining beach, those of the Lesser Tern seemed to lie in small colonies amongst the shingle. Thus I found, in a space not more than a hundred yards square, no less than twenty-five eggs of the latter, no nest containing more than a couple. The Sheldrakes, which nest in large numbers hereabouts, were just hatching, and I observed four broods of nine, six, eight, and eleven, respectively, on the lower portion of the River Irt.

A month later (July 5th) the young Sheldrakes were still enveloped in down, but were able to run with great speed. On being pursued at low tide they took to the sandhills in preference to the water, nor was it at all an easy matter to overtake them. Being anxious to try and rear a few, I took home half-a-dozen with this object; but, though they fed well, half of them died within a fortnight, and the survivors escaped a day or two later, and were no more seen.

On July 12th I once more wended my way to Walney Island, and on reaching the sandhills found that the Gulls had nearly all gone. The Terns were beginning to fly, though there were still a few recently-hatched young ones about, as well as some fresh eggs. The wet weather of the last month seemed to have had a bad effect on the gulls, as well as on the young rabbits, as large numbers of both were lying dead in the hollows amongst the hills. A few old Sheldrakes were visible on the mud, but I was unable to distinguish any young birds of this species. Curlews were particularly numerous, having apparently returned from their breeding haunts inland.

Passing over the next two months, during which I recorded nothing that is worth repeating, I find a note to the effect that six House Martins were seen on Walney Island on October 5th, and remained in the same locality for several days. About the

middle of this month the usual immigration of Short-eared Owls took place, and on the 25th I put up a flock of eight amongst the sandhills. Happening on this occasion to fall in with my friend the watcher, I was particularly requested to kill all the Owls I could, as they preyed upon the rabbits. I need scarcely say that I did not comply with his request, feeling confident that it is the abundance of mice alone that attracts these interesting birds to the locality. On the same day I noticed a single Wheatear, which seemed to have been deserted by its companions.

A few days later, whilst out fishing in a small yacht, I came to the conclusion that sea-birds were more plentiful than usual this year. In the course of two or three hours we observed some hundreds of Razorbills, Guillemots, Kittiwakes and Scoters, as well as a few Gannets and larger Gulls; but, though I kept a careful look out on this, as on all other occasions, I was unable to detect any of the Skuas of which in some localities there has been of late such a remarkable influx.

During November the only birds worth noticing which came under my observation were four Red-breasted Mergansers, shot on the channel between Walney and the mainland, and a couple of Dippers procured in Cumberland. The gizzards of the latter proved on dissection to contain numerous remains of minute beetles, intermixed with some fibrous material, apparently of a vegetable nature. By the end of this month winter had set in with a severity which threatened to equal that of 1878-9. Ducks and other wildfowl driven from inland waters by the frost, and rendered comparatively tame from the same cause, were plentiful on the sea-coast.

On December 2nd sixteen Swans were seen and shot at by a local gunner as they flew down the channel between Barrow and Walney Island. The following day nine Geese, probably Bernicles, were observed in the same locality, and several of the latter species were procured during the next fortnight. Golden Plovers appeared about the middle of the month in unusual numbers, and, what was somewhat remarkable, three Sheldrakes were trapped on Walney in one night. Before Christmas the inland species of birds were reduced to almost the same straits as they had been at the commencement of the year, and flocks of Larks, Wagtails, and Starlings might be seen feeding amongst the snow with the Sparrows in the streets of the town.

ORNITHOLOGICAL NOTES FROM DEVON AND CORNWALL.

By JOHN GATCOMBE.

NOTWITHSTANDING the severe weather of the past winter some of the sea birds assumed their spring or breeding plumage unusually early. On January 5th I examined a Common Guillemot in full breeding dress, so far as colour was concerned, though many of the new feathers were perhaps not quite so long as they would have been had the bird been obtained a little later, their bases being still enveloped in their blue cases; but on January 16th I met with another in quite a perfect state. Razor-bills and Cormorants were also undergoing change, but were not so far advanced. By the 21st Herring Gulls were uttering their spring cry, but I do not think had yet attained their breeding dress. A Slavonian Grebe, Purple Sandpiper, Turnstone, and Common Snipe were sent from Looe for preservation, the Snipe being supposed to be the first ever shot or seen on Looe Island. I also examined a Crested Grebe, killed on the Cornish coast, the stomach of which contained the remains of fish and a kind of coralline mixed up with the usual quantity of feathers. Grebes of all kinds are, I am sorry to say, getting very scarce, and only make their appearance during very severe weather. In our markets I observed large numbers of Wild Ducks, Widgeon, Teal, a few Brent Geese, and some Redshanks. The last-named birds have become regular winter residents in this locality. Our birdstuffers received some immature Goosanders, Red-breasted Mergansers, and a Northern Diver, the last named unusually scarce last winter, and the same may be said of the Red-throated Diver, which is becoming more uncommon every year.

On January 24th, wind east, with snow, and very cold, I visited Brent, about sixteen miles from Plymouth, where I met with the only Fieldfare I had seen for the season, and a few Redwings, which were also the first I had seen, although during the severe cold of last winter the towns were swarming with them. The scarcity of these common winter birds has, I believe, been remarked throughout the United Kingdom. Lapwings were very numerous and remarkably tame, and I was pleased to see several Dippers and Grey Wagtails by the sides and on the large stones in the River Avon.

On January 28th, during hard frost, the mud-banks of the Laira, near Plymouth, were covered with hundreds of Gulls, chiefly *Larus ridibundus*, with a sprinkling of Herring Gulls, Common Mews, and a dozen Herons; but there seemed to be an entire absence of the Sandpiper and Plover tribe. Rooks and Starlings were in abundance, eagerly searching among and turning over the seaweed all along the shore. A fine old male Cornish Chough was brought to a Stonehouse birdstuffer; a great pity it should have been killed, but some of these scarce birds are, I am sorry to say, destroyed every season. A curious light variety of the common Wild Duck was sent up from Scilly, and considered a great rarity. It was almost white, with the brown markings showing very faintly, and the front of the neck and lower parts of a beautiful buff, similar to that of the male Goosander, but the speculum on the wings was of the usual dark violet or purplish blue, forming a marked contrast to the rest of the plumage. I had great difficulty in persuading the birdstuffer that it was only a variety, although certainly a very pretty one.

On February 17th two Red-necked Grebes were bought in the market, and, on examination, I found their stomachs to contain small fish, portions of crabs, sand, and a great quantity of feathers; but I am sorry to add that the skins of these scarce birds were cut up for the purpose of decorating ladies' hats. A Little Auk was taken inland, near Mevagissey, on the Cornish coast, and an immense flock of Gannets were observed in the channel. The markets at this date were unusually full of Lapwings and Wood Pigeons; some of the Lapwings were beginning to assume the black throat. The harbour and sound were also full of Kittiwakes, and many Great Black-backed Gulls were in full summer plumage.

On February 20th I watched a fine old Cormorant close in shore, and noticed that it was in full breeding-dress, with good crest, hoary neck, and a white spot on each thigh. Shags were in the same forward state. On the same day I examined the largest Guillemot I think I ever saw. It weighed two pounds eleven ounces.

My friend Mr. Clogg, of Looe, has kindly furnished me with the following interesting notes:—"When standing on the bridge, during the cold weather of February, I saw on one

occasion, in the mill-pool, fourteen Little Grebes in close company—so close, indeed, that they might have literally been covered with a sheet. I watched them for some time through a glass, but did not see one of them dive. A short time since a Cormorant passed over my head and settled in the mill-pool, the water at the time, I should think, not two feet in depth at the deepest part. It immediately began to feed, and I will venture to say that within ten minutes it had captured and swallowed no less than three flatfish (one of considerable size) and two green crabs, all of which must have been alive in the stomach at the same time. As soon as it had completed its meal it went off again to sea.”

Mr. Clogg also informed me that the Herons are again breeding in Trenant Wood at Looe, and that he had during the previous month seen three pairs nesting there. On the 17th of March, which he considers rather a late date, he saw a large flight of Lapwings, consisting of some hundreds. These birds seem to have been very plentiful last winter, especially in Ireland, where Mr. Robert Warren speaks of them, in the last number of ‘The Zoologist,’ as “even more so than in the great Lapwing year of 1877.”

On March 2nd a Puffin was brought to one of our birdstuffers, still in winter plumage, with dark bill and cheeks, but whether this was a spring arrival or a bird which had remained with us during the winter I am unable to say. Its stomach was empty. By the 7th *Larus ridibundus* had assumed its dark head, and on the 11th Wheatears had made their appearance in this neighbourhood. I observed the Chiffchaff on the 17th, and also the Ring Ouzel. The Channel at this date was full of Razorbills, Guillemots, and Gannets, and a fine Pomatorhine Skua was obtained, the latest I heard of last season. It was in moult, and would soon have attained its full breeding-dress. A short time previously a male Red-breasted Merganser was sent up from Looe, and I found its stomach crammed with atherines or sand-smelt (*Atherina presbyter*), and blennies, some of which were nearly four inches long. Strange to say, this was the first adult Red-breasted Merganser I had ever seen killed in Devon or Cornwall, although the young are frequently met with during severe weather, and even in comparatively mild seasons.

On March 29th a flock of about thirty or forty Siskins were

seen on the larches in Bickleigh Vale, and four were obtained; their stomachs were full of insects. I heard from a friend in Ireland that Siskins were plentiful in the County Armagh, where they sometimes breed. In my last notes (p. 47) I mentioned that a large number of Long-eared Owls had been received by our local birdstuffers, and a short time since I was told by a clergyman that a flock of above thirty had been seen in Sheviok Wood, near St. Germans, Cornwall, at this date. Lesser Black-backed Gulls were congregating in pairs, preparatory to the breeding season, all in full plumage, and making a great noise.

On April 6th an adult Buzzard was brought to one of our local birdstuffers. Its plumage was rather worn and much bleached by exposure to the weather, but there were new feathers of a fine fresh brown appearing in different parts of the neck and back. I have kept Buzzards in confinement—two of them for fourteen years each—and remarked that they were a long time completing their moult, sometimes the whole summer. [This is always the case with Peregrines, and doubtless with other birds of prey.—ED.] They both eat fish, and were rather partial to earth-worms, which they would regularly hunt for on the grass-plot after rain. I shall never forget the instinct displayed by one of these birds on my throwing towards it a dead snake. At once its wings and every feather of its body were raised, its eyes appeared to flash fire, and, standing as high as it could on its legs,—I suppose to avoid being bitten,—it suddenly darted out one foot, and, clutching the reptile just behind the head, held it, so to say, at arm's length, never for one moment relaxing its hold, but, with continued jerks and convulsive grasps, kept it firmly fixed until it was supposed to be dead; when, lowering its wings and laying every feather perfectly smooth, it began quietly to enjoy its meal, not tearing the animal in pieces, but merely picking off the flesh from head to tail, and leaving a tolerably good skeleton, which, I remember, remained in our garden for some months. I was the more struck with the instinct displayed in dealing with a snake because the bird had been brought up almost from the nest, and therefore could not have come in contact with many reptiles in a wild state, though, of course, its parents may have brought some to the nest. On April 16th another Buzzard was similarly trapped.

On April 10th a Puffin was brought in by a Plymouth fisherman, and on the 28th I heard and saw several Whimbrels. A nest of young Ravens, fully fledged, was brought from Dartmoor about the same date.

OCCASIONAL NOTES.

HUNTING THE WILD CAT.—To my remarks under this heading (Zool. 1878, p. 251) the following may be added:—In 1205 (6 John) Gerard Camville had special license to hunt the Hare, Fox, and Wild Cat throughout all the King's forests; and in 1239 (23 Hen. 3), in consideration of a Goshawk given to Simon de Pierpont, Earl Warren obtained leave to hunt the Buck, Doe, Hart, Hind, Hare, Fox, Goat, Cat, or any other wild beasts in certain lands of Simon's. But it was not for diversion alone that the Wild Cat was hunted. Its skin was much used as trimming for dresses, and in this way was even worn by nuns at one time. Thus in Archbishop Corboyle's Canons, anno 1127, it is ordained "that no Abbess or Nun use more costly apparel than such as is made of Lambs' or Cats' skins"; and as no other part of the animal but the skin was of any use here, it grew into a proverb that "You can have nothing of a cat but her skin."—J. E. HARTING.

WILD CAT AND OTHER RARER INDIGENOUS MAMMALS OF SCOTLAND.—I have for some time back been working out the past and present distribution of the above, and have already in manuscript a pretty full account of several, including the Wild Cat, Marten, Polecat, Badger, and Black Rat. I have also notes upon a number of others. I should be glad if readers of 'The Zoologist' will assist me, and let me know of anything bearing upon the subject from time to time.—JOHN A. HARVIE BROWN (Dunipace House, Larbert).

BADGER AND POLECAT NEAR LEEDS.—The Badger is a very rare animal in this neighbourhood; two specimens, however, have been obtained since Christmas. The first one was shot on February 24th, by Mr. Wright, the head keeper to Mr. Lane Fox, of Bramham Park. It was discovered asleep under a tree, and was shot with a view to its being preserved for his museum. It was in good condition, and weighed over three stone. The second one was killed on Mr. Tennant's estate at Leacroft. It is possible that these animals may have been a pair, male and female, for they were found within a couple of miles of each other. I saw a Polecat at Adel last month. This is another scarce animal hereabouts, for being great enemies to the gamekeepers, the latter do all they can to destroy them.—W. RAINE (Leeds).

WHITE BADGER IN HAMPSHIRE.—Mr. W. G. Stewart Menzies, of Cudares, dug out at Kempshott, Hants, in the spring of 1879, a white Badger, which was unfortunately killed by the terriers. It is not absolutely white, but of a very white buff, or cinnamon tint. The stripe on each side of the face, and the under side of the body and the legs, which are normally black, are of the same pale tint. The nose and lips (as stuffed) are flesh-coloured, and the eyes pink. I did not myself see the animal in the flesh, but Mr. Menzies is sure that these points are correct. The head, with the exception of the above-mentioned stripe, is, as usual, white. The claws are of a very pale yellow colour, semitransparent. It is a female, and weighed twenty pounds. Its teeth are much worn down and one or two of the canines chipped; but as it made a violent attack on the spade with which one of the men was digging, as well as a determined defence against the terriers, I should suppose the state of the teeth to be not necessarily a sign of age.—ALFRED HENEAGE COCKES (Great Marlow, Bucks).

THE GREAT BUSTARD IN FRANCE DURING THE WINTER 1879-80.—In 'The Zoologist' for January (pp. 25, 26) and March (p. 110) attention was directed to the unusual number of Bustards which were met with during the past winter in Cornwall, Dorset, Kent, Essex, and Cambridge-shire, as well as in Jersey. A similar visitation seems to have occurred in France, and has been reported in 'Le Naturaliste,' a small quarto journal of eight pages, published fortnightly in Paris by M. Deyrolle, 23, Rue de la Monnaie. In the number for February 15th, the Editor says:—"The severe cold of last winter certainly affected the passage of certain migratory birds. Amongst the observations which we have collected on this subject, we ought first to mention the unusual occurrence of the Great Bustard, *Otis tarda*. A good ornithologist, whom we have had occasion to quote more than once, Dr. de Montessus, of Chalon-sur Saône, writes us as follows:—"On the 10th of January last I received from Autun a magnificent Great Bustard. It was a male, killed at Luzy, on the borders of Nièvre and of Saône-et-Loire. A few days previously another was captured nearer to me, at Verdun-sur-le-Doubs, Chalon-sur-Saône. On receiving news of this capture, I at once took steps to obtain the bird, but was too late: it had already brought together a dozen Vandals, who devoured it piecemeal and enjoyed it; notwithstanding which, it was to be mounted by a petty taxidermist in the neighbourhood for the previously agreed price of ten francs. The Vicomte de Chaignon wrote me word that two similar captures had been made in the neighbourhood during the early part of December, one of which was a male, the sex of the other not mentioned. He did not get possession of either of these birds, which probably shared the fate of the one at Verdun. The Great Bustard, therefore, is not yet

extinct. My specimen was in company with eight of his fellows. At Verdun they saw another besides the one killed. It is during severe winters that this bird visits us. In 1850, in the month of February, during a long frost, two specimens which I possess were killed in our plain, a short distance from the Saône. A female bird was given to me about fifteen or twenty years later. M. Mongeard, of Autun, to whose kindness I am indebted for the specimen of 1880, has noticed in the journal 'L'Acclimatation' for July, 1876, two captures made in 1875 in Le Morvan.' To these observations of M. de Montessus, we may add that we have seen this year two specimens of the Great Bustard in the flesh, one belonging to M. Lécuyer, of Carquebret, Manche, and the other to M. Capron, of l'Île Adam, Seine et Oise. They were certainly killed in the neighbourhood of these two localities, although we have no precise details on the subject. Information less positive, however, enables us to state that the Great Bustard has been killed in the departments of Oise, of Seine et Marne, and of Tarn et Garonne. All these captures were made during the second half of December. We have ascertained also that, about the same time, some were observed in the Paris market. From this we may infer, therefore, that during the past winter the Great Bustard was unusually abundant in several parts of France." In a succeeding number of 'Le Naturaliste' (March 15th), Mr. R. de Larelause, of Mont Louis, Vienna, writes:—"I have read in 'Le Naturaliste' the remarks of Dr. de Montessus concerning the Great Bustard (*Otis tarda*), to which I may add that on the 16th of January I saw at some distance a flock of birds which looked very large, and which I did not at first recognise. I approached them by going through a wood, and shot at them at about seventy yards. I was fortunate enough to bring one down, which I then recognised as a Great Bustard (*Outarde barbie*). It was a male bird, at least four years old, but extremely thin. It weighed, however, 7 kilogrammes 500 grammes, and measured in extent of wings 2 metres 30. It was accompanied by eighteen or nineteen others of its species. On the 5th of December another flock of five was seen by a poacher, who succeeded in killing one. I hastened to send and ask him for it, but it was too late, it was half plucked. On the 29th of January I received word that three enormous birds were on the same spot where I killed my Bustard some days previously. I went there, and found another lot of Great Bustards; but this time I was not so fortunate. I wounded one, but without being able to secure it, as it managed to follow the others at a distance. On the last day of the shooting season one was seen at Poitiers by a sportsman, who shot at it, but did not kill it. I remarked that the direction of their course was from the north-east towards the south-west, that they made short flights of about fifteen to eighteen hundred yards, and after the first flight became much more wary." From this it will be seen that during

the past winter there must have been an extensive migratory movement of Bustards over a considerable area, and it would be interesting to have details of any other examples that may have been seen or shot, and not hitherto recorded, in order to trace if possible the starting-point of the migrating flock or flocks, the route taken, and the probable destination. The cause of such a movement can be only faintly surmised.—J. E. HARTING.

ATTEMPTED DOMESTICATION OF THE GREAT BUSTARD.—It may not be generally known that some years since the Acclimatisation Society of Paris offered prizes for the successful domestication of the Great Bustard, one of the conditions being that the birds should be proved to have laid and hatched eggs in confinement. In the 'Bulletin' of the Society for 1861 (p. 318) is an interesting communication from Mr. Althammer, giving the result of his attempts to domesticate this bird in the Tyrol. Three eggs were laid in August, 1860; the hen bird sat, and incubation lasted twenty-five days, at the end of which time one young one was hatched. A similar attempt was made in Warwickshire, in 1876, by Mr. F. Lythall, of Offchurch, near Leamington, who turned out some Bustards on his farm. On the 10th December in that year he wrote me word:—"The Bustards are tame, and eat out of the hand. They are loose by day, and shut up at night. I think they pair, but they have not laid at present, or if they have, I have not found the eggs. They associate with the fowls and turkeys, and take a fly occasionally." I have had no further report since that date.—J. E. HARTING.

SUPPOSED OCCURRENCE OF THE TAWNY OWL IN IRELAND.—When visiting some friends who reside upon the peninsula of Howth, near Dublin, I was informed that they had constantly heard some Owls hooting at night around the house. My first efforts to hear the birds were unsuccessful, owing apparently to these having been moonlight nights, when these Owls remain silent. A few days since, however, on a dark moonless night, I listened for hours to the well-marked and unmistakable note, "tu-whit, tu-who, oo," which I believe is peculiar to the Tawny Owl. To make quite sure I have devoted two other nights to a careful observation of the bird's cry, which I heard at intervals from ten o'clock throughout the night, and as the sounds proceeded simultaneously from different quarters, there were no doubt several individuals concerned. The darkness of the night, and the apparent wariness of the birds, who were no doubt perfectly aware of my ambuscade, totally prevented my having a chance of obtaining a shot. I cannot but think that I have lit upon a colony of the Tawny Owl. I am aware that there is as yet no well-authenticated instance of its occurrence in Ireland. Further, that it is only recently that these birds have established themselves would appear highly probable from the following information:—

About seventeen years ago the peculiar cry first attracted the notice of a relative of mine living in a house adjoining the grounds above mentioned. The younger members of the family called my uncle's attention to the circumstance, and he, after having heard it, took a peculiar pleasure in what he was wont to consider one of the curiosities of Howth. I am well aware that Sir William Jardine is often quoted as having shot a White Owl in the act of hooting; but the almost universal opinion of ornithologists is against him, nor have I been able to discover the original passage containing his statement. Further I do not think the White Owl could have spontaneously developed a hooting cry, unless, as Mr. Waterton suggests when criticising Sir William Jardine, it had been in the habit of hearing and imitating the hooting Owl. I may add that I am well acquainted with the Long-eared Owl and the White Owl, our only two resident species, and have never heard them utter a note in the least resembling the cry to which I have so carefully listened at Howth. As I have never heard the Tawny Owl in England, however, I should be glad to learn if any of your readers have heard the doubly repeated "tu whit, tu whit," with a prolonged "oo,"—the latter sometimes repeated also,—to proceed from any Owl except the Tawny.—H. CHICHESTER HART (Dublin).

[The late Sir William Jardine is not the only naturalist who has testified to the occasional "hooting" of the Barn Owl. See J. Colquhoun, 'The Moor and the Loch' (ed. 1878, vol. ii., p. 58) and W. Boulton, Zool. 1863, p. 8765. With regard to the alleged occurrence of the Tawny Owl in Ireland, it is observable that Smith, in his 'Ancient and Present State of the Co. and City of Cork,' 1750, 2nd ed. 1774, describes as "well known" the Brown Owl and the Grey Owl (p. 328), which we take to be the sexes of the Tawny Owl, and states "that they feed on Mice, and in the evening destroy Rabbits." He includes the Barn Owl in his list as "the Common Barn Owl, White Owl, or Church Owl."—ED.]

BREEDING OF THE POCHARD AND SCAUP IN IRELAND.—I have often been on the point of sending a few notes on the breeding of these ducks in Ireland, but delayed doing so in the hope of obtaining the eggs. As Mr. Gatcombe, however, has started the subject, I may say a few words thereon. Since I first handled a gun, when about twelve years old, I have been a good deal amongst wildfowl. For many years I lived within about four miles of Lough Neagh. When a boy, I used to shoot everything I saw, and at any time of the year: and one of the birds I obtained, almost every July, was the "flapper Red-head" or young Pochard—I should say from about the 20th onwards, but at that time I kept no diary. These Pochards consisted of young birds numbering from five to eight (I think I have seen ten), an old duck, and very often the old drake somewhere in the neighbourhood, if not with the brood. My mode of attack used to be as follows:—

I would paddle up (in a flat-bottomed boat) as if going past, then circle round and round. If the old drake was there I used to try first to get a shot at him, for after the first shot he was not approachable if he was wild. I used to edge in towards the brood, for if I followed him too far I found, when he had flown off, that the others had disappeared in some mysterious way. Having failed to get a shot at him, I would turn my attention to the duck and young. I seldom shot the old duck; I suppose I was tempted by the "brown" of the flock. The old duck, on finding me approaching, would swim off, followed by the clutch. As I pressed them they would go faster and faster, until they would be almost standing or running on the water; if I did not take a shot then, the result of being hurried in this way was that the old bird would flap or fly off quite low in a circle or semicircle round the boat; at the same moment the young would make a rush, some dive, others flap away. I have known one to go to the shore in this way seven or eight hundred yards, in which case I would not get another chance at the flock for the rest of that day, and the odds were that I would not bag two at the most after this, as each bird would take a different direction, and the only one to be seen was the old duck, about a hundred and fifty yards off, in a very restless and excited state. I always found these birds on Lough Beg, a lough one mile north of Lough Neagh. These broods of Pochards used to be far more numerous than they are now. The last time I was there, in August, 1878, I shot, on the 8th and 12th, some young Pochards which could fly about two hundred yards. There was only one brood that I could find that year. I am sorry that I cannot give other dates, but know that it was in July—after the 20th, and before August 20th—that I used to have this shooting. I have shot the Scaup at the end of August, but they were always able to fly at this time of the year, and in flocks of from six to eight or ten usually. I have seen the Tufted Duck remain paired, but have never shot the young before September, so far as I can recollect, though I have seen the old drakes about by themselves in the summer. On one occasion I caught an old dark Tufted Duck that got carried over a fall in the Bann, between Lough Neagh and Lough Beg; it was moulting and could not fly, but seemed well enough, judging from the chase it gave before I got it into my landing-net. They may breed, but I am sure that the Pochard does, and hope some day to procure eggs. I believe the Scaup breeds in Lough Neagh, but not on Lough Beg. I will keep the skins of the next young Pochards I obtain, so as to prove my statement. Though I am quite satisfied myself, I know other ornithologists would like more substantial proof. I heard of the case referred to by Mr. Gatcombe, and said at the time that I thought it was nothing strange, particularly at that date.—H. L. Cox (Army Medical Department).

GREEN WOODPECKER IN SOMERSET.—In the April number (pp. 140, 141) the Editor suggests that the fact of so large a number of Green

Woodpeckers being killed in Somersetshire may indicate a migratory movement towards the south-west. In the May number Mr. Cecil Smith "cannot agree with the editorial remark" above quoted, but accounts for their destruction by the additional number of shooters caused by the late hard winter. Both causes, it seems to me, may have brought this about. Anyone who has closely watched the effects of the late severe winter of 1878-79, and carefully recorded the numerical decrease of certain species in Scotland, cannot fail, in my opinion, to be convinced of the fact that unusual migration took place, and that there was during the following summer a crowding down upon more southern latitudes of many species, and a dearth perfectly saddening to see in more northern ones. No doubt winter killed a great number, but the late spring and short summer delayed the spring migration of 1879, until the birds found themselves obliged to breed further south. This year (1880), I am glad to say, our copses and coverts, gardens and shrubberies, appear to be as full of bird-life as formerly.—J. A. HARVIE BROWN (Dunipace House, Stirlingshire).

CORRECTION OF ERROR.—In the fifth line of the foot-note on the first page of "Report on the Migration of Birds in the Autumn of 1879" (Zool. May, 1880), for "winter of 1879-80" read "winter of 1878-79." In 'Nature,' May 13th, it is said, "The Manxmen were silent." From Point of Ayr we received a very able and full report. The Isle of Man stations are included under "Commission of N. Lighthouse," Section W. of Scotland.—J. A. H. B.

RED-LEGGED PARTRIDGE IN GUERNSEY.—In Mr. Cecil Smith's recently published book on the 'Birds of Guernsey,' no mention is made of the Red-legged Partridge, from which it is to be inferred that this bird is unknown there. It is worthy of note that in Willughby's day (two centuries ago) it was believed to exist both in Guernsey and Jersey, for at p. 23 of that author's 'Ornithology' we find this remark:—"We have been informed that the Red-leg'd Partridge, *Perdix ruffa*, is found in the Isles of Jersey and Guernsey"; and further on (p. 167), "This kind is a stranger to England: howbeit they say it is found in the Isles of Jersey and Guernsey, which are subject to our King."—J. E. HARTING.

CUCKOOS DENUDED OF FEATHERS.—In 'The Zoologist,' April, 1866, appears a reference to the tradition of Cuckoos being sometimes found denuded of feathers. I have not met with any later notice of this; but having recently discovered a similar tradition to obtain in the Isle of Man, and hearing of one instance that occurred here about thirty years ago, when a Cuckoo was found in this state by a farmer in the midst of his peat stack, was induced to make inquiries, and sent a short notice to 'Science Gossip,' January, 1880. In the April number of that magazine is given another instance, which occurred in Somersetshire about ten years ago. As

the first notice I have seen appeared in your magazine, I thought it might be of sufficient importance to warrant me in again calling the attention of your readers to the strange fact, if fact it be, of this bird so casting its feathers in the winter. Has the like been observed of any other bird? How is it accounted for? Is it only when hybernating with us that it happens? Perhaps some of your readers may shed light on the subject, by informing us of instances of which they may have heard, or, better still, which may have come under their own observation. Hitherto the accounts, unfortunately, appear to have been all at second-hand.—PHILIP M. C. KERMODE, Ramsey, Isle of Man.

[Nothing of the kind has ever fallen under our observation, nor have we ever investigated such a case, none having been reported to us. Under these circumstances we can scarcely venture to offer any opinion. We may remind our readers, however, that young Cuckoos are sometimes hatched very late in the summer,—later than many other birds,—and scrambling away from the nest of their foster-parents (which continue to feed them until they can fly), might well be found in some wood stack, or other place of shelter, in a half-fledged state. We remember some years ago, while on a visit to Sir John Crewe, at Calke Abbey, to have seen a young Cuckoo in this condition at no great distance from the house.—ED.]

WOODCOCK CARRYING ITS YOUNG.—On the 13th of this month two ladies, inmates of this house, put up a Woodcock in a wood here, which rose within a yard of their feet, carrying a young bird between its legs pressed close to its body. It was so near that the feet of the little one hanging down were plainly seen. The ladies, on being shown immediately afterwards the plate in 'The Zoologist' for November, 1879, observed that it differed from the view presented to them, in showing the old bird as grasping the young one in its claws, and in the non-appearance of the feet of the young bird. I may observe that Woodcocks have for many years bred here yearly, and in increasing numbers.—CLERMONT (Ravensdale Park, Newry).

COMMON SCOTER IN CAMBRIDGESHIRE.—On April 19th we were Rook-hawking in Cambridgeshire, near Whittlesford, and had some good flights, although the wind was rather too high. Just as we were leaving off, the farmer over whose land we had been riding came up to tell us that a curious bird had been captured the previous day on his farm, that he still had it alive, and that nobody could say what it was, except that it was some kind of duck. At my request it was sent for, and shortly arrived in a wicker coop, when I found it to be a female of the Common Scoter. It had been picked up in an exhausted state in one of the ditches on the farm, apparently driven inland (at least forty miles from the sea) by the gale

which had been blowing for two days previously. I brought it back with me to London, and presented it to the Zoological Society, in whose Gardens it may now be seen in good health and plumage. A few days since, while watching it diving in pursuit of fish, which it caught easily, I remarked that it did not use the wings under water like a Guillemot, but kept them pressed close to the sides, propelling itself by means of the feet alone.—J. E. HARTING.

SISKIN NESTING IN BEDFORDSHIRE.—It may interest some of your readers to know that two nests of the Siskin were found on my premises last May (1879), and that several young ones were reared. This is the first instance, so far as I am aware, of this pretty little finch nesting in our midland county.—HENRY BURNEY (Wavendon Rectory, near Woburn).

[Further particulars of the situation selected, materials of nest, number of eggs, and so forth, would have been interesting. Perhaps our correspondent will supply them.—ED.]

RARE BIRDS IN OXFORDSHIRE.—I am sorry to have to record the following interesting and (in this district) rare birds as having been lately shot in this county:—Common Tern, on the canal near Sumerton, on April 26th; Ring Ouzel, at Epwell, same day; Whimbrel, at Bloxham, on April 29th; two male Golden Orioles, in a wood near Great Tew, about the beginning of May; and an immature specimen of the Black-headed Gull, picked up dead about the same time. About the middle of March last a Peregrine Falcon struck at a decoy Wood Pigeon in a field near Marston St. Lawrence, Northants, and was shot. I had the pleasure of examining it, and found it to be a female in good condition. I am afraid the Wild Birds Preservation Acts have very little effect just here. On April 23rd I saw a large Gull fly over, but was unable to determine the species. Fieldfares are staying late this year; I saw about a dozen on May 9th.—OLIVER V. APLIN (Bodicote, near Banbury).

UNUSUAL NUMBER OF EGGS IN A THRUSH'S NEST.—On May 2nd I found, near Ipswich, a Thrush's nest with the unusually large number of eight eggs. At first I was of opinion that some one had added eggs from another nest; but I learned on enquiry that such was not the case, the only persons having access to the plantation not being aware of the existence of the nest. On a subsequent visit the bird was sitting on the eggs. I believe this fact to be worth recording, as probably the only instance on record of a Thrush laying as many as eight eggs.—H. MILLER, JUN. (Ipswich).

HOBBY NESTING IN ESSEX.—I have ascertained beyond doubt that a pair of Hobbies bred last year near Belhus Park, in Essex, having seen

a splendid male, which our former keeper shot from the nest, he having also shot at the female.—CLIFTON (Cobham Hall, Kent).

THE SALMON DISEASE.—At a meeting of the Dumfriesshire Natural History Society, held on the 30th April last, the Secretary read a paper on the origin of the Salmon disease. Upon examination and careful dissection of specimens under the microscope, he found that when Salmon are first affected they have one or two small white spots generally near or on one of the fins, often the dorsal or caudal fin. These spots gradually extend, until in many cases the fish is nearly covered. When the disease begins to affect the constitution of the fish, they look languid, and gradually draw into the smooth and shallow water. When seen in the river the white spots look like mould, such as is generally seen on decaying animal or vegetable matter. When the fish is taken out of the water that mouldiness assumes a matted, slimy appearance, and can easily be scraped from the scales with a sharp knife, in most cases leaving no trace. The mouldy-looking substance placed under the microscope reveals that it is a fungus—viz, *Saprolegnia ferox*, the filaments of which take all sorts of forms. The spores of the fungus have a motion of their own inside the parent cell, and when the proper time comes they are discharged by the sporangia at the apex of the filaments, and then take the form of zoospores, having two “cilia” moving about in the water like true *animalculæ*, ready to attach themselves to any proper substance that may come in their way on which to germinate, and throw out filaments similar to those from which they came. Considering the thousands of filaments on one single spot of the disease, and the number of spores given off by each, the quantity of zoospores lodged in and floated down an affected river must be beyond calculation. One feature noticed in connection with these zoospores was, that if a stream of liquid was made to flow across the field they could attach themselves to the glass, so that they were not carried away by the stream, and by the same means, therefore, they could attach themselves to stones, &c., in the river, or to the dorsal fin of a Salmon. The roots of the fungus were not traced beyond the skin that covers the scales. On making a cut into the fish through the fungus, there is seen an inflamed, unhealthy-looking stratum of muscle below the skin, of varying thickness. In one fish examined it extended right through to the inside. Sections of this muscle when placed under the microscope were found to be literally one mass of life—that life being a species of *bacteria*, or small discoid-looking bodies, embedded in and moving amongst the striated muscle fibre of the fish; and when, by pressure or otherwise, they are forced into the surrounding fluid they have a power of motion in a circular direction. In some fish examined the muscle was almost detached from the strong fibro-muscle layer of the skin, and the muscle fibres of that layer were not

adhering together as in their natural state, and could be separated from each other like threads by the needle. Whether that diseased condition of that part of the skin was caused by the state of the muscle immediately below it, or by the fungus on its surface, the author of the paper was unable to say. Should the fish live long enough, ulceration of the affected parts must take place. The disease was located in the muscle of the fish, and perhaps commences in the blood, caused either by the food they eat or by some deleterious solution in the water which passes through the gills, and the unhealthy, decaying fluid or matter, which naturally passes off from these *bacteria* and exudes through the pores of the skin, forms a *nidus* for the germination of the zoospores of the fungus. Owners of aquaria state that, previous to the growth of the fungus on a fish, it exhibits signs of indisposition. Dr. Carpenter, writing of Fungi, says, "There are various diseased conditions of the human skin and mucous membranes in which there is a combination of fungoid vegetation and morbid growth of the animal tissues, such as *Tinea favosa*;" and that "it is a disputed point whether the morbid condition or the fungus is the disease." The first is rather consistent with general analogy, and especially with what is known of the conditions under which the various kinds of fungoid "blights" develop themselves in or upon growing plants. Unless there is a predisposing cause, fish will not contract the fungoid part of the disease; they must have a disease or decay in their body on the products of which the fungus germinates and grows. He believed that salt is not very favourable to the growth of *S. ferax*; but, as far as the *bacteria* in the muscle is concerned, no washing by any solution will affect it. He had cut sections of muscle containing them, and placed one in a saturated solution of salt and one in clean water, and kept them for several days. Those in the salt solution were as lively at the end of the period as when taken from the fish; in fact, they did not die until they were placed in a preservative fluid containing arsenic. If this disease is cured by the return of the fish to the sea, it must be ascribed to the food they get there and the general invigorating influences, and not to the fact of their being washed externally by sea or salt water. He had no faith in putting salt, acetic acid, or any other chemical in the water, believing that by the time the diseased fish were expected to be cured, they and all other fish in the river would be killed. He was of opinion that the cause must be looked for in the water, by examining, chemically, microscopically, and experimentally, quantities of water taken from the river in the autumn when it is very small, after a long absence of rain. Mr. Robert Service said it seemed to be a rule, almost without exception, that before a race of animals or plants is attacked by any epidemic of fungoid or other origin, they must have become predisposed to such attack by a weakened constitution or actual disease. Mr. Rutherford's discovery of *bacteria* in countless myriads in the flesh of Salmon attacked

by the fungus at once takes us a step nearer the origin of the mysterious disease. The presence of *bacteria* at once accounts for the luxuriant growth of the *Saprolegnia*, which has had such a fatal effect on the Salmon. The spores of this fungus are always present, ready to germinate into active life when a proper *nidus*—such as the skin of a sickly or wounded fish—comes into contact with them. It remains to be ascertained what impairs the constitution of Salmon and other fish so as to permit of *animalculæ* living in their flesh. He thought it, in some measure, due to the absence of Otters. The Otter is the natural enemy of the Salmon in fresh water; but they have been hunted, trapped, and shot till not one remains where formerly there were dozens. The Otter, like the Peregrine, he thought, takes the prey most easily captured, thus removing the weakly, the sick, and all those which, from whatever cause, would cause a degeneration of the breed. If there had been Otters in the district in the numbers in which they once were, he thought those wretched-looking Salmon to be seen along the sides of the Nith would all have been dragged out and eaten by them. He felt confident that if the Otters, just for a change, were protected for a year or two, the disease would be checked.

THE EAGLE RAY OFF PLYMOUTH.—A very perfect, but rather small, specimen of that rare fish, the Eagle Ray, *Myliobatis aquila*, caught off Plymouth, was purchased on May 1st by Mr. Brooking Rowe, and is now in process of preservation. Its measurements, as nearly as could be ascertained, were as follows:—The whole length of body, not including the long cord-like tail, about 9 inches; breadth across the pectoral fins, 18 inches; length of tail, 20 inches, furnished with a dart or spine having reversed serrated teeth at the sides, and placed within a few inches of its base. The back is raised and sloping towards the snout, and also towards the tail, which is very long and slender, ending in a point, about twice the length of the body. Colour above of a dark purplish brown, shading to dark slate on the back; under parts nearly pure white. Head, eyes and mouth very toad-like in appearance; hence it is sometimes called "Toad-fish."—JOHN GATCOMBE (55, Durnford Street, Stonehouse, Plymouth).

UNUSUAL ASSEMBLAGE OF THE MASKED CRAB.—On May 1st my trammel, of forty fathoms in length, was shot east and west on a rocky bottom in about three fathoms water at two hundred fathoms south of our pier-head, and throughout it—not in any particular place, but scattered—I took twenty-eight male and seventeen female (altogether forty-five) specimens of the Masked Crab, *Corystes cassivelaunus*. This crab is not an uncommon one, but I have never before taken it except in single specimens, and never, that I can recollect, on a rocky bottom. It is essentially a sand crab.—THOMAS CORNISH (Penzance).

PROCEEDINGS OF SCIENTIFIC SOCIETIES.

LINNEAN SOCIETY OF LONDON.

May 6, 1880.—H. T. STAINTON, F.R.S., in the chair.

Three Foreign Members were elected, *viz.*, two distinguished botanists, M. C. J. de Maximowicz, Director of the Imperial Botanic Gardens, St. Petersburg, and Prof. E. Strasburger, of the University of Jena; and one zoologist, Prof. Elias Metschnikoff, the indefatigable Director of the Zoological Institute of Odessa, and whose researches, both embryological and anatomical, among the marine invertebrata hold a high place.

Prof. P. Martin Duncan orally communicated the substance of a paper "On an unusual form of the Genus *Hemipholis*, Agass." This was dredged by Dr. Wallich off the Agulhas Bank, S.W. of the Cape of Good Hope. Its zoological position may be doubtful, for the classification of the *Ophiurioidea* is at present full of anomalies; but the specimen nevertheless possesses unusual interest, from the peculiar nature of the so-called dental or chewing apparatus. These oral structures and other specialities of conformation were elucidated in detail by the author.

Prof. E. Ray Lankester read a paper "On the Tusks of the Fossil Walrus found in the Red Clay of Suffolk." He now withdraws the generic name of *Trichecodon* instituted by him in 1865, and refers a series of later discovered large tusks in the Ipswich Museum, including the former specimens, to belong to the living genus *Trichechus*, but he specifically distinguishes this as *T. Huxleyi*. Prof. Lankester, moreover, is inclined to think there is very insufficient grounds for the generic subdivisions *Alachtherium* and *Trichecodon*, as used by Prof. Van Beneden, nor is there evidence, according to the former, for the association of the Suffolk and Antwerp tusks.

A short communication, "On an irregular Species of *Amblypneustes*," by Mr. Charles Stewart, was taken as read.

A letter was read by Mr. Thomas Christy on Mr. Blacklaw's unsuccessful endeavour to raise the Liberian coffee at St. Paulo, Brazil; and a paper on Brazilian Algæ, by Prof. Dickie, and another, by Mr. T. Bettany, against the use of tri- and poly-syllabic terms in botanical nomenclature, were read and discussed.—J. MURIE.

ZOOLOGICAL SOCIETY OF LONDON.

May 4, 1880.—Prof. FLOWER, LL.D., F.R.S., President, in the chair.

The Secretary read a report on the additions that had been made to the Society's Menagerie during the month of April, and called special attention

to an example of the Short-nosed Perameles, *Perameles obesula*, purchased April 15th, being the first example of this marsupial which had been received; to a young male Cape Hunting Dog, *Lycan pictus*, presented by Mr. C. Ernest Pope, of Alice, Victoria East, South Africa, received April 19th; and to a Koala, or Native Bear of Australia, *Phascogaleus cinereus*, purchased April 28th, being the first example of this peculiar marsupial that had been brought alive to Europe.

Mr. Selater exhibited a specimen of the Ibis, *Geronticus comatus*, lately obtained at Biledjik, on the Euphrates, by Mr. Danford, and made some remarks on its previously known distribution.

Dr. A. Günther read a note correcting the statement made by him at the meeting of the Society on the 20th January last, respecting the occurrence of *Holocanthus tricolor* on the British coast. Further particulars received by Dr. Günther had led him to decide that this fish could not be considered as having been caught on the British coast.

Mr. W. A. Forbes read a note on the cause of death of a Leopard in the Society's Menagerie.

Mr. Dobson exhibited and made remarks on some bones of the Dodo, which had been transmitted from Mauritius in 1847-50, by Dr. F. Reid to Sir James Macgregor, and having been deposited at Fort Pitt, Chatham, were afterwards removed to Netley Museum.

Mr. F. Jeffrey Bell exhibited the immature specimen of *Echinolampas* referred to by him in his communication on *Palaeolampas*, pointing out its more differentiated characters, and suggested the possibility of its being an example of *E. oviformis*.

Prof. Flower called the attention of the meeting to the fact that a young specimen of the Lesser Fin Whale, *Balaenoptera rostrata*, 15 feet long, which had been taken off the coast of Cornwall, was now being exhibited in London.

A communication was read from Prof. J. O. Westwood, containing an account of the species of Sawflies composing the Australian genus *Perga* of Leach.

A communication was read from Dr. W. J. Hoffman on a supposed instance of hybridization between a Cat and a Lynx.

Mr. W. A. Forbes read the second and third parts of his series of papers on the anatomy of the Passerine Birds. These communications related to the syrinx and other points in the anatomy of the *Eurylamidae*, and to the structure of *Philepitta* and its position amongst the Passeres.

A communication was read from Mr. F. Day, in which he gave the description of a new Entomostrocon from Afghanistan.

Mr. Oldfield Thomas read a paper on a collection of Mammals brought from Ecuador by Mr. Clarence Buckley. Amongst these was a new species of *Bassaricyon*, proposed to be called *B. Alleni*.

Mr. A. G. Butler read a paper containing descriptions of a collection of Lepidoptera made by Major Howland Roberts at Rokeran, near Kandahar, on the River Urgundab.

Mr. G. French Angas read a paper containing further additions to the marine Molluscan Fauna of South Australia, with descriptions of six new species. A second paper by Mr. Angas contained the descriptions of three species of marine shells from Port Darwin, Torres Straits, discovered by Mr. W. J. Bednall, and a new *Helix* from Kangaroo Island, South Australia.
—P. L. SCLATER, *Secretary*.

ENTOMOLOGICAL SOCIETY OF LONDON.

April 7, 1878.—H. T. STAINTON, F.R.S., Vice-President, in the chair.

The following gentlemen were ballotted for and elected Ordinary Members:—George Carter Bignell, 7, Clarence Place, Stonehouse, Plymouth; W. D. Cansdale, 4, Guithavon Terrace, Witham, Essex; Frank Crisp, LL.B., B.A., Sec.R.M.S., 5, Lansdowne Road, Notting Hill, W.; and the Rev. W. Fowler, M.A., F.L.S., Repton, Burton-on-Trent. M. Ed. André, 21, Boulevard Brétonnière, Beaune (Côte d'Or), France, was ballotted for and elected a Foreign Member.

Mr. John T. Carrington exhibited a pale variety of *Arctia caja*, bred by a gentleman at Croydon, who had been experimenting upon the effects of the rays of light transmitted through glasses of various colours upon the species. The variety exhibited had been reared under green glass, but there was no evidence to show that the variation was due to the green rays.

The Secretary read the following communication from Mr. G. A. J. Rothney, of Calcutta, "On Insects destroyed by Flowers":—

"I notice in the report of your proceedings for April 2nd, 1879, a letter from Mr. J. W. Slater, from which I copy the following extract:—'Whilst it is generally admitted that the gay coloration of flowers is mainly subservient to the purpose of attracting bees and other winged insects, whose visits play so important a part in the process of fertilization, it seems to me that one important fact has scarcely received due attention. Certain gaily-coloured, or at least conspicuous, flowers are avoided by bees, or, if visited, have an injurious and even fatal effect upon the insects. Among these are the dahlia, the passion-flower, the crown-imperial, and especially the oleander. That the flowers of the dahlia have a narcotic action both upon humble-bees and hive-bees was first pointed out by the Rev. L. Jenyns, in his "Observations on Natural History" (p. 262). He mentions that bees which visit these flowers are "soon seized with a sort of torpor, and often die unless speedily removed," &c.'

"As regards the dahlia, this is so directly opposed to my recent

experience in this country that I should like to record the following observations.

"I was staying at the hill-station of Mussoorie in September and October of last year,—a time when the wild dahlias* were at their greatest perfection, and formed a striking feature in the scenery,—there were numbers of other wild flowers of various species in profusion, but the dahlias formed the particular attraction of the Aculeate Hymenoptera, and my richest collecting ground was always where the dahlias grew thickest, my most favoured spot and warmest corner being at a place called Wolfsburn Road, Laudun, where I could stand up to my waist in a rich bank of dahlias of all colours, and collect around me in the shortest possible time the greatest number of specimens and variety of species to be obtained anywhere in or near Massoorie. I am not certain of many of the species captured, but the following genera were strongly represented, especially the first three:—*Bombus*, *Apis*, *Vespa*, *Andrena*, *Halictus*, *Protopis*, *Polistes*, *Odynerus*, and others; besides which, had I been collecting them, I might have taken many species of butterflies, day-flying moths, ichneumons, as well as several species of Diptera and Coleoptera. The dahlias were mostly single, but a few double ones were also to be found. The bright yellow single flowers appeared to be the most attractive—that is, in taking up my position on the steep bank I preferred to plant myself in a mass of yellow flowers to any other colour. I never observed that any bee, wasp, or other insect was injured in any way by visiting these flowers. I never found a dead one in or under the dahlias, and certainly, from the activity required to capture them, I never came across any bee or wasp suffering from 'narcotic action' or 'seized with a sort of torpor.' Under one fine bush of the yellow single flower I found the nests of a large species of humble-bee, and spent many hours in watching the workers fly in and out and to and from, the dahlia flowers, covered with the yellow pollen, and they never seemed any the worse for their excesses; indeed they were uncommonly lively, and on one occasion, when I had been capturing too many of their fine females, the workers fairly drove me off the ground by their most persistent attacks."

The Secretary then read a paper by Mr. Peter Cameron entitled "Notes on the Coloration and Development of Insects." Professor Westwood communicated two papers:—"On two Gynandromorphous specimens of *Cirrochroa Aoris*, Dbl., an Indian Species of Nymphalideous Butterflies," and "On *Cetonia Aurata* and *Protactia Bensoni*." Specimens and drawings were exhibited in illustration of the last paper, showing the specific distinctness of the insects in question.

* Mr Rothney must be mistaken in speaking of the "wild dahlia" in India, as this plant is Mexican, and not Indian, as pointed out by several Members on hearing the above communication.—Ed.

May 5, 1880.—H. T. STAINTON, F.R.S., Vice-President, in the chair.

Mr. Peter Inchbald, of The Lodge, Hovingham, York, a former Member, was ballotted for and re-elected into the Society.

Mr. W. C. Boyd exhibited a very pale specimen of *Nyssia hispidaria*, taken at light at Cheshunt Station.

Mr. M. J. Walhouse exhibited some Geodephagous beetles which were found only on the summits of some of the highest mountains in India.

Mr. W. L. Distant exhibited a long series of specimens of the Madagascar Homopteron *Ptyelus Goudoti*, Benn., to illustrate the extreme variability of the species. The series showed a gradation from melanic forms having the tegmina and pronotum black, to an albinic variety in which the tegmina and pronotum were pale luteous. One specimen was asymmetrical in the markings of the tegmina, thus possessing the characters of two varietal forms, as shown in the accompanying woodcut.



Mr. Distant observed that he had found this not at all an exceptional occurrence in extremely variable species of the order *Rhynchota*. Like other species of this and allied genera, *P. Goudoti* in the larval condition emits a frothy secretion, which M. Goudot described as being done so plentifully at the time of the greatest atmospheric temperature, as to assume the appearance of actual rain. From an experiment made with sixty or seventy larvæ, M. Goudot concluded that a vessel holding nearly an English quart could have been filled with this secretion in an hour and a half.

Mr. Stainton pointed out that this series offered a good illustration of the danger of founding a species on a single specimen.

Mr. T. R. Billups exhibited two living specimens of *Carabus auratus*, found in the Borough Market, and probably introduced with Belgian potatoes.

Mr. F. P. Pascoe stated that he had recently heard a rumour to the effect that the Sphinx-moth with a proboscis of sufficient length to reach into the nectar of *Anagracum sesquipedale*, predicted by Mr. Darwin and Mr. Wallace to occur in Madagascar (see also Proc. Ent. Soc. 1878, p. iii.), had actually been captured in that island, and he asked whether any Members of the Society were able to confirm this statement.

Mr. M'Lachlan remarked that as a believer in the doctrine of Evolution, he thought that much harm was done to it by its friends, of which this was, in his opinion, an example.

The Chairman asked whether any Members had observed the date of appearance of insects this season.

The Secretary stated that a copy of a work, edited by Miss Ormerod, had just been presented to the Library by its Editor, in which an immense number of meteorological observations had been tabulated, in such a manner as to lead to the hope that some light might be thrown by this and future work conducted on a similar plan on the connection between meteorological phenomena and the appearance of insects, &c.

Miss E. A. Ormerod remarked that the records from which the 'Cobham Journals' had been reduced were taken by Miss Caroline Molesworth at Cobham, Surrey, and extended, with more or less completeness, over a period of about forty-four years. The coincident observations of weather and the state of animal and plant life in a continuous form extended over only about twenty-six years,—from 1825 to 1850 inclusive,—and the present volume contained the reduction of these observations as far as they bear on these points of coincidence. One object in view had been to give by abstracts and summaries such a statement of the successive states of temperature, amount of rainfall, and direction of the wind, as would enable the reader to see, by a glance at the parallel columns of each month's entries, what periods of marked variation or non-variation occurred in what is commonly known as "the weather." The tables given in the work had been directly reduced from Miss Molesworth's careful records preserved in the library of the Meteorological Society, and Miss Ormerod, the Editor of the 'Journals,' had added an introduction giving the necessary working details, together with a chapter of "Results of Observations," working out the coincidences that appeared between meteorological and phenological conditions—*i. e.*, between states of weather and subsequent dates of plant-life, the appearance of spring birds, &c. Miss Ormerod added that, from an entomological point of view, it was much to be regretted that Miss Molesworth, who was remarkable for the extreme accuracy of her observations, did not give more records regarding insects. There were, however, a few, and one of special economic interest, in which the larvæ of the "Turnip Sawfly" are noticed as causing damage in August: at the beginning of September there occurs an entry of "myriads of *Haltica nemorum*," and after a fall of rain which cleared them away, the "Turnip Sawfly" appeared in the imago state on the same ground, showing that the rainfall had no beneficial effect in preventing their development. Miss Ormerod stated, in conclusion, that from one series of records spreading over such varied and important branches of observation, no certain conclusions could be at present drawn, but the work in question might offer valuable suggestions

for future observers. The results of similar records carried out hereafter may throw much light on the meteorological principles of cultivation, and Miss Molesworth, who was one of the first to lead the way in the path of joint observation, deserves our grateful remembrance.—R. MELDOLA, *Hon. Secretary.*

NATURAL HISTORY SOCIETY OF GLASGOW.

The eighth and concluding meeting of the session was held on Tuesday, April 27th, in the Library of Anderson's College, Prof. JOHN YOUNG, M.D., F.G.S., in the chair.

The proceedings opened with an address by the President "On Critical Periods in Geology," in which he reviewed the several epochs, and illustrated his remarks by a large geological map of the world.

Mr. Thomas King exhibited a growing specimen of the common primrose, *Primula vulgaris*, in which the points of the calyx had been metamorphosed into true leaves.

Mr. Peter Ewing showed specimens of *Petasites alba* from the neighbourhood of Barrhead. This plant, which differs not only in the colour of its flower but in other respects from the common butterbur, is not indigenous, but may be considered as an escape from shrubberies, although found in many different localities.

Mr. John M. Campbell exhibited a specimen of the Collared Peccary, *Dicotyles cajacu*, Linn., and made some remarks on the distribution and habits of the genus.

Mr. Peter Cameron exhibited specimens of *Microgaster sericeus*, a parasite on *Thera juniperata*, from Milngavie. When it leaves the caterpillar on which it has fed it spins a cocoon attached to the spine, where it in its turn is attacked by other ichneumons, of which he had bred two species of *Hemitetes*. He also exhibited two species bred from the galls of *Lasioptera juniperina*, viz., *Torymus juniperi* (Linn.), a species new to Britain, and an undescribed species of *Lygyocerus*, which it was proposed to name *juniperi*. He also showed a gall from Cadder of *Aphilothrix elementina*, a species new to Britain.

Mr. J. J. Dalgleish contributed a paper "On the Irruption of Skuas, principally *Stercorarius pomatorhinus*, on the Scottish Coasts, in the Autumn of 1879."

Mr. John A. Harvie Brown read a monographic sketch of "Barra Head, and its Bird-Life," being principally based upon the personal observations of Mr. George M'Lachlan, formerly lighthouse keeper at Barra Head, and upon the minor results of a short visit made to that locality by Capt. H. W. Feilden and himself in 1870. After taking notice of the accounts of

previous writers, as Martin, M'Gillivray, &c., Mr. Brown proceeded to give a general description of the cliffs of the island, and thereafter treated of the several species of rock-birds inhabiting it.

A paper by Mr. Robert Etheridge, jun., was read, "On the Occurrence of the Genus *Pentremites* in the Carboniferous Series of the East of Scotland." The author stated that in the 'Geological Magazine' for March, 1878, he called attention to the probable occurrence of the genus *Pentremites* in Scottish carboniferous rocks. A few crushed specimens of a small *Pentremite* had been since found at Kidlaw, in Haddingtonshire. Unfortunately, as is often the case in specimens of unusual interest, these examples were either so fragmentary or greatly crushed that the author was afraid that little beyond satisfactorily proving the identity of the genus could be made of them. However, further examination gave a more hopeful view of the case, and he was enabled to give a description of the fossils.

A second paper was read by the same author entitled "Notes on Carboniferous Brachiopods." The several points treated of may be enumerated—(1), On the colour markings in *Lingula mytiloides*, Sorv.; (2), On the occurrence of *Syringo thyris-cuspidata* in Scottish carboniferous strata; (3), Notes on *Spiriferina Etheridgei*, Davidson; (4), Notes on *Chonetes polita*, M'Coy; (5), On the punctate structure of *Orthotites crenistria*, Phillips; (6), On a small, distorted, and probably young form of *Chonetes* from the carboniferous beds of the East of Scotland; (7), On a small specimen of *Orthis*, perforated by a crinoid stem. The remarks on the various species treated of were illustrated by drawings and full descriptions of the figures given.

NOTICES OF NEW BOOKS.

Recherches sur la Mue du Bec des Oiseaux de la famille des Mormonidés. Par le Docteur LOUIS BUREAU. (Extrait du 'Bulletin de la Société Zoologique de France,' 1879.) Royal 8vo., pp. 63; planches et carte. Paris: Savy, 77, Boulevard St. Germain.

IN 'The Zoologist' for July, 1878 (pp. 233—240), we gave a translation of the more important portions of a remarkable paper by Dr. Bureau "On the Moults of Bill and Palpebral Appendages in the Common Puffin," then recently published in the 'Bulletin de la Société Zoologique de France.'

Since that date Dr. Bureau has been actively engaged in studying other species of the Puffin family, with a view to

ascertain whether they, or any of them, undergo a similar seasonal change of bill. The result of his enquiries has lately been published in the 'Bulletin' of the above-mentioned Society, and has been issued in separate form, with six coloured plates and a map showing the distribution of the different forms of *Fratercula arctica*, of which Dr. Bureau recognises three. His remarks are too long to admit of translation in these pages, hence we must content ourselves with giving a brief summary of the results arrived at.

For the Puffin and its allies Dr. Bureau establishes a family, *Mormonidæ*, distinct from *Alcidæ*, and, as above stated, recognises three forms of the Common Puffin, which he designates *armoricana*, *islandica*, and *glacialis*. His map shows the geographical distribution of these three forms, so far as at present ascertained. *Armoricana* is the form which predominates in the British Islands, the Færoe Isles, the western coast of Gothland, and the northern shores of France. *Islandica* occurs along the coast between the North Cape and the Varanger Fjord, Iceland, South Greenland, Newfoundland, and the southern coast of Labrador; while *glacialis* is found throughout Spitzbergen, the cliffs of Prudhoe Land abutting on Smith's Sound, and the northern coast of Labrador.

With some slight variations, which are described, Dr. Bureau finds that the following species shed portions of the bill in the same way as the Common Puffin does, namely, *Fratercula corniculata*, *Lunda cirrhata*, *Ceratorhina monocerata*, *Ombria* (vel *Phaleris*) *psittacula*, and *Simorhynchus cristatellus*. One species at present remains undetermined as to the moult, namely, *Simorhynchus camtschaticus*, while *Simorhynchus microceros*, which Dr. Bureau identifies with *S. pusillus* of Pallas, has been found to moult the tubercle only.

We may here remark that, since the publication of Dr. Bureau's first memoir on the subject, Mr. Robert Ridgway, of Washington, has been engaged in independent research on this very question, and in the current number of the 'Bulletin of the Nuttall Ornithological Club' (p. 126) he has briefly stated the result of his investigations. His conclusion is that "a similar change from the breeding to the winter condition exists in the North Pacific species of *Fratercula* (*F. corniculata*), in *Lunda cirrhata*, *Ceratorhina monocerata*, the species of *Simorhynchus*

(*cristatellus* and *pygmæus*), and in *Ciceronia microceros*, but probably not in any other of the North Pacific forms, except perhaps *Phaleris psittacula* and *Ptychorhamphus aleuticus*."

As regards the synonymy of the species dealt with, Dr. Bureau's determinations coincide with the views of Dr. Elliott Coues, as expressed in 1872 in his 'Key to North American Birds.'

The general result of Dr. Bureau's labours may be characterised as highly satisfactory, and we recommend to our readers the perusal of his instructive memoir in its entirety. We have given above the name of the Paris publisher, and the pamphlet may be doubtless obtained through any bookseller.

Notes of Observations of Injurious Insects. Report, 1879. London: W. Swan Sonnenschein and Allen. 1880.

Two years ago we had occasion to notice the first of these reports, and then expressed our agreeable surprise at the amount of support which this laudable project had received. The report for 1878 was a great improvement on that for 1877, and now in last year's report we have a vast amount of most useful and interesting information. The forty-four pages are full of practical experiences and suggestions for the limitation of those pests of whose presence the farmer and gardener are so well aware.

Miss Ormerod appears to have obtained competent observers in many districts, extending from Orkney to Cornwall, and we are glad to see one or two Irish notices. The important information elicited from many Scottish foresters is quite a feature in this year's report. We should like to give our readers a short extract as a sample of the kind of information contributed, but there are so many which commend themselves that we must forbear to select. Our only wish is that all interested in the attacks of injurious insects will study the pamphlet for themselves, and we can safely say that Miss Ormerod will be very glad either to give or receive any information on this subject. Thirty-two destructive species are selected for special observation. Good figures and descriptions are given of most of these.





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HAWKS AND HAWKING.*

By J. E. HARTING, F.L.S., F.Z.S.

It has been said that the history of animals interests us in proportion as they are of service to us, or are the means of providing us with amusement. Hawks are capable of both, and on this account, therefore, may be said to deserve a greater share of attention than is generally accorded to them at the present day. We are all hunters by nature. We have an inherent passion for chasing and taking wild animals, and feel an inward satisfaction in outwitting their natural instinct which prompts them to fly from us, by our reason which is exercised by observation of their habits. Our ancestors were hunters through necessity. They had to chase and kill wild animals in order to live. They either pursued them with hounds till they were brought to bay, and then slew them with sword or spear, or stalked them in the forest, and killed them with bow and arrow, or with a sling. The larger animals were taken in nets, pitfalls, or other devices, and succumbed to the united strength of numerous assailants.

Birds which in their own element, the air, evaded pursuit, were taken either in snares or with birdlime, the use of which appears to have been known at a very early date. By degrees, it would seem, from continued observation of their predatory habits, hunters conceived the idea of snaring birds of prey and of training

* Being the substance of one of the 'Davis Lectures,' delivered at the Zoological Gardens, June 24th, 1880.

them to be of use to them in the chase; in other words, they instituted the art of Falconry or Hawking.

The origin of this art it is now impossible to discover. From the earliest times of which history takes cognizance people of all nations, but more particularly those of eastern origin, have practised the sport; and we may form some idea of its antiquity from Sir A. H. Layard's discovery of a bas-relief amongst the ruins of Khorsabad, in which a falconer is represented carrying a hawk upon his wrist. From this it is to be inferred that hawking was practised there some 1700 years B.C. In China it was known even at an earlier date than this; for in an old Japanese work, of which a French translation appeared at the beginning of the present century,* it is stated that Falcons were amongst the presents made to princes in the time of the Hia dynasty, which commenced in the year 2205 B.C. The records of King Wen Wang, who reigned over the province of Hunan between 689 and 675 B.C. show that in his day Hawking was much in vogue there.† In Japan it seems to have been known many centuries before the Christian era, and probably at an equally early date in India, Arabia, Persia, and Syria.

From the East it was introduced into Europe, although the precise date of such introduction is unknown; but from the allusions made to the sport by Aristotle,‡ Pliny,§ Ælian,|| Martial,¶ and Oppian,** brief and even vague though they be, we may infer that Hawking was known to, if not practised by, Europeans at least three centuries before the Christian era.

John of Salisbury, who died in 1182, discussing the question of the origin of Falconry in Europe,†† arrived at the conclusion that it was introduced into Greece by Ulysses after the siege of Troy, an opinion which has been endorsed by several subsequent writers. According to Von Hammer,‡‡ however, the Turks were the first masters of the art in Europe, and imparted it to the

* 'Topographie de la Province Kawatsi,' par Akizato Rito, avec des planches faites par Tokei, peintre de Tanba-no. 6 vols. 8vo, 1801.

† The authority for this statement is an ancient Chinese MS. quoted by Schlegel, in his 'Traité de Fauconnerie.'

‡ Hist. Anim. i. lib. 9, cap. 36.

§ Hist. Nat. lib. 7, cap. 10.

|| De Nat. An. lib. 2, cap. 42.

¶ Epigr. lib. 14, no. 216.

** Cynegeticon, lib. 1, 62—66.

†† 'De nugis curialium, et vestigiis philosophorum,' lib. 1, cap. 4.

‡‡ Falknerklee, p. xx., quoted by Schlegel, *op. cit.*

Persians, who in turn instructed the Greeks and Arabs. This view receives some confirmation from a recently published French translation of an Arabic MS. of the 10th century on Hunting and Hawking, which is now before me.* In this work it is stated that the first falconer, according to an Arabic tradition, was a King of Persia. During one of his excursions he was greatly interested in watching unobserved the actions of a wild hawk. He saw it perch upon a bough "with the air of a sovereign upon his throne," where it watched for an opportunity to seize a passing bird. He saw it at last take one, and having made a meal of it, fly down to the river, drink and bathe, and then return to its tree. He was struck with admiration at its majestic appearance, its wonderful patience, and its power over other birds, which it seemed to take by sovereignty of nature, and was seized with a desire to possess it. His fowlers gratified his inclination by snaring it. He caused it to be tied on a perch near him, and succeeded in taming it, learning many a lesson from observation of its good qualities. It was asserted, indeed, as a consequence, that this king, who was naturally of a violent disposition, became, through this lesson, a better administrator and a wiser sovereign. The Arabic writer from whom I quote remarks that "the *savans* of Greece pretend that it was in Greece that falcons were first trained, but Mohamed ben Mangali (the author) says, and is inclined to believe, that it was in Persia that the art of Falconry was invented."

It would be beside my present purpose, however, to discuss any further the question of origin, or to detail the development and spread of Falconry in countries beyond the British Islands. This would not only be a very considerable task, but it is to a great extent rendered unnecessary by the existence of Professor Schlegel's admirable folio work, '*Traité de Fauconnerie*,' which is illustrated, by Mr. Wolf, with coloured plates of all the hawks used by falconers, and which should be consulted by everyone who takes an interest in this subject.

Although the precise date of the introduction of Hawking into England cannot now be ascertained, we know from several sources that it was practised by our ancestors in early Saxon times. In a letter addressed by King Ethelbert (A. D. 748—760) to St. Boniface, Archbishop of Mayence, who died in 755, the

* '*Sid Mohamed el Mangali, Traité de Venerie, traduit de l'Arabe par Florian Pharaon.*' Tiré à 300 exemplaires numérotés. Paris, 1800.

monarch asked him to send over two Falcons that would do to fly at the Crane, for, said he, "there are very few birds of use for this flight in our country," *i. e.*, Kent.*

Asser, in his 'Life of Alfred the Great,' says of this king, "His felicity in hunting and hawking, as well as in all the other gifts of God, was really incomparable, as I myself have often seen."†

William of Malmesbury records much the same of Athelstan, who was extremely fond of Hawking, and procured his hawks from Wales.‡ The same historian (*lib. ii. cap. 13*) thus describes Edward the Confessor's love of hunting and hawking:—"It was his chiefest delight to follow a pack of swift hounds in pursuit of their game, and to cheer them with his voice, or to attend the flights of hawks taught to pursue and catch their kindred birds. Every day after divine service he took the field, and spent his time in these beloved sports."

So general was the pastime in Saxon times that the monks of Abingdon found it necessary to procure a charter from King Kenulph to restrain the practice in order to prevent their lands from being trampled on.

Strutt gives an engraving from a MS. of the end of the 9th or beginning of the 10th century, representing a Saxon nobleman and his falconer with hawks on the bank of a river where a crane and wild ducks are feeding. Another drawing upon the same subject, with a little variation, occurs in a Saxon MS. of somewhat later date.

Every British chieftain kept a large number of hawks,§ and in the 10th century, as we gather from the Laws of Howel Dha, Hawking was a favourite sport with the Britons in Wales. The Penhebygdd, or Master of the Hawks, was the fourth officer in rank and dignity, and sat in the fourth place from his sovereign at the royal table. He was permitted to drink no more than

* *Epistolæ Sancte Bonifacii* in *Max. Bibl. patr.*, vol. xiii., *Epist. xl.*, p. 85. See also *Chronicum Saxonium*, Ed. Gibson (1692), p. 56; 2, and p. 60, 1.

† See also Florence of Worcester, *Chronicon*, ann. 871, p. 310; and Spelman, 'Glossarium Archæologicum,' pp. 6, 7.

‡ It is recorded by this chronicler that Athelstan required of the Welsh "*Volucres quæ aliarum avium prædam per inane venari noscerent.*"

§ A passage in Ossian (*i.*, p. 115) refers to a negotiation of peace by the proffer of 100 managed steeds, 100 foreign captives, and 100 hawks with fluttering wings that fly across the sky.

three times, lest he should neglect his birds from intoxication; and when more than usually successful, the prince was obliged by law and custom to rise up and receive him as he entered the hall, and sometimes to hold his stirrup as he alighted from his horse. Spelman relates that a British chief named Gaufredus, A.D. 1008, was struck on the head with a stone and killed by an angry woman, because his hawk had seized one of her fowls: "*quod accipiter ejus mulieris gallinam invaserat.*"

Hawking was pursued by all the Norman princes with the greatest enthusiasm. In those days a person of rank seldom stirred out without a hawk upon his hand. In old paintings and tapestry this was a sign of nobility, a good illustration of which is furnished by the celebrated Bayeux tapestry, which is preserved in the cathedral of Bayeux, in Normandy, and is there known as "*la toilette du Duc Guillaume.*" It is 200 feet long, and about two feet six wide, and is said to be the work of Queen Matilda, the wife of the Conqueror. It represents the departure of Harold for Normandy, and the conquest of England by William the Conqueror. Harold and Guy Comte de Ponthieu are represented each carrying a Sparrowhawk on the wrist.*

From the time of Henry I., that is to say, from the commencement of the 12th century, and during many subsequent reigns, offences against the crown were often punished by the infliction of a fine of so many hawks;† prisoners were ransomed on similar terms;‡ and lands were held of the king by the tenure of finding annually one or more falcons, or of providing for their keep.§ Stringent laws were passed, making it felony to steal a trained hawk, and subjecting offenders in this respect to fine and imprisonment. It was even made illegal to take the eggs of any falcon or hawk, and in the reign of Henry VII. things came

* Lancelot, 'Explication de la tapisserie de Bayeux, dans les Mémoires de l'Acad. des Inscriptions et Belles Lettres,' Paris, vi. p. 739; and viii. p. 602.

† In the reign of Stephen, Outi of Lincoln was fined 100 Norway hawks, and as many Jerfaleons, of which four of the former and six of the latter were to be white. Mag. Rot. 5 Steph. Rot. 12 a. Madox, Hist. and Antiq. of the Exchequer, vol. i. p. 273.

‡ In 1212, during one of the Welsh campaigns of King John against Llewellyn ap Iorwerth, Prince of North Wales, the king, passing the river of Conway, encamped by its side, and sent part of his army, with guides of the country, to burn Bangor. This they did, and, amongst other prisoners, took Rotpart the Bishop, who was afterwards ransomed for two hundred hawks!

§ Blount, 'Ancient Tenures,' *passim*.

to such a pass, that, without the king's permission, no one could even fly a hawk that had been bred in England, but if he wanted one was obliged to import it from abroad.* Concerning the prices paid for hawks formerly, abundant information may be found in Court Rolls, Privy Purse Expenses, and various Household Books, from which sources of information also may be learnt the value, at various periods, of hawks' hoods and bells, falconers' wages, and other expenses relating to the sport.†

Our kings frequently received presents of hawks from foreign potentates, and often made similar presents themselves. Edward I., in 1276, received eight grey and three white Jerfalcones from the King of Norway,‡ some of which he seems to have forwarded to the King of Castille, a letter of his to that sovereign being extant in which he says:—"We send you four grey Jerfalcones, two of which are trained to fly at the Crane and Heron; as to the other two, you can use them as you think best. Having already lost nine white falcons we have none of these at present to offer. Meanwhile we have sent some of our people to Norway to fetch some."§

The Norwegian hawks were early celebrated for their quality and beautiful plumage. They are mentioned in the old romance of 'Sir Tristram' as being anciently objects of commerce and importation:—

"Ther com a schip from Norway
To Sir Rohandes hold,
With hawkes white and grey
And panes fair y fold."||

* The following are amongst the principal statutes relating to Hawks and Hawking:—Hen. III. Carta de Foresta, cap. xi.; 34 Edw. III. c. 22; 37 Edw. III. c. 19; 11 Hen. VII. c. 17; 31 Hen. VIII. c. 12; 5 Eliz. c. 21; 23 Eliz. c. 10 7 James I. c. 11.

† See the Rotulus Misæ, 14 John; the Originalia Rolls, 35 Edw. III.; the Privy Purse Expenses of Edward IV., Hen. VII., and Hen. VIII.; Issues of the Exchequer, James I.; Duke of Buckingham's Household Book, 1507; the Northumberland Household Book, 1512; the Household Books of the L'Estranges of Hunstanton, 1520; and of Squire Kytson, of Hengrave, Co. Suffolk, 1572; and of Lord North, 1575. In his 'History of Agriculture and Prices in England' (vol. ii. p. 566), Prof. Thorold Rogers quotes the prices given for hawks in various parts of the country during the reigns of Henry III. and Edward I.; and in my 'Ornithology of Shakespeare' (pp. 77—82) I have given similar quotations of prices in Shakespeare's day.

‡ Thorkelin, *Analecta Hist. Regni Norwegici*, p. 158.

§ Rymer, *Fœdera*, i. p. 186 (3rd ed.)

|| 'Sir Tristram,' fytte 1, xxviii. (ed. 1833).

Their value may be inferred from the fact that in this romance twenty shillings is staked in a game of chess against one hawk; and a further testimony of their value is given by Olaus Magnus, who states that the white ones were never shot at by the inhabitants, but were considered sacred, unless they did too much hurt and rapine.*

The practice of sending presents of hawks to the English court was continued during many reigns. John Chamberlain, in a letter to Sir Dudley Carleton, dated 15th November, 1617, relates how the Muscovian ambassador had an audience of the king, and brought divers presents of furs, estimated at better than £6000, and divers hawks with coats or coverings of ermison satin and other colours, embroidered with pearl.†

Again, Pepys, describing the entry into London of the Russian ambassador, 22nd November, 1662, writes:—"I could not see the ambassador in his coach; but his attendants in their habits and fur caps very handsome comely men, and most of them with hawks upon their fists to present to the King. . . . The King took two or three hawks upon his fist, having a glove on wrought with gold, given him for the purpose."

The King of Denmark sent Iceland Falcons to the court of Great Britain between the years 1699 and 1703, and to the Prince of Wales from 1741 to 1745.

Did space permit, a long account might be furnished of the doings of many of our kings in the hawking-field; but it must suffice if we select only a few illustrations.

In October, 1172, Henry II. was at Pembroke, South Wales, *en route* for Ireland, where, says Giraldus Cambrensis, he amused himself with the sport of hawking. He chanced to espy a noble falcon perched on a crag, and, making a circuit round the rock, he let loose upon it a large high-bred Norway hawk, which he carried on his left wrist. The falcon, though its flight was at first slower than the other bird's, having at last mounted above it, became in turn the assailant, and, stooping from aloft with great fury on the Norway hawk, laid it dead at the king's feet. From that time, it is said, the king used to send every year, in the proper season, for young falcons from the cliffs of South Wales, for in all his lands he could not find better or more noble hawks.

* Ol. Mag. Hist. Goth. Angl. 1658, p. 200.

† 'Court and Times of James I.' vol. ii. p. 54.

Richard Cœur de Lion, while in the Holy Land, amused himself with hawking at Jaffa, in the plain of Sharon; and it is related of him that he sent an ambassador in vain to Melik el Aadil to try and procure some fowls for the hawks which he had brought with him from England, and which he desired to present to the Sultan. On another occasion, while passing through Dalmatia, he carried off a falcon which he saw in one of the villages, and, on refusing to give it up, was attacked so furiously by the villagers that it was with great difficulty, and only by valiantly defending himself, that he managed to make his escape.

King John used to send to Ireland for his hawks, amongst other places to Carrickfergus, Co. Antrim,* and was especially fond of a flight at the Crane with Jerfalcones, which he received from Philip, King of Norway. He used to hawk in Dorsetshire and Somersetshire, as appears by entries in the Court Rolls of payments of the expenses of the journeys. Here is an extract from the 'Rotulus Misæ,' 1212—13:—

“On Wednesday, the Feast of the Innocents [Dec. 28th], at Eiswell, alms contributed, to buy food for 350 paupers, by the King, who proceeded to capture and took 7 Cranes, with his Hawks, for each of which he feasted 50 paupers, and every one of them had one penny summa . . . 29s. 2d.”

Again:—

“On Wednesday next following the Purification at Limbagan, as alms to 100 paupers whom the King fed, as he went with his Gerfalcones to capture Cranes, and having taken 9 Cranes, he commanded the aforesaid paupers to be fed with bread, meat, and ale to the amount of 13s. 4d.”

These entries serve not only to illustrate the history of Hawking in England, but are interesting as proving the former existence of the Crane in this country in sufficient numbers to be flown at when required. Nor are these exceptional instances. In the Wardrobe Accounts of King Edward I., preserved in the British Museum (Add. MSS., No. 7965; Ed. I., 1297-8) is the following entry:—

“Jan. 5. To Alexander Coo, the King's falconer, for presenting to the King 3 Cranes taken in Cambridgeshire by the Gerfalcones of Sir Geoffrey de Hauville 6s. 8d.”

* Cf. Rotulus Misæ Anno Regis Johannis quarto decimi, A.D. 1212-13.

When Edward III. invaded France, he had with him, according to Froissart, thirty falconers, and every day he either hunted or went to the river for the purpose of hawking, as his fancy inclined him. A curious description of a hawk's perch of this period, which a lady had put up at the head of her bed and covered with blue velvet, is given by Chaucer, in "The Squire's Tale" (pt. ii.)

The Paston Letters, written in the reign of Edward IV., give us also a curious insight into the ways and doings of English falconers in the middle ages;* as do likewise the various Household Books and Privy Purse Expenses already referred to. Henry VII. used to import Goshawks from France, and gave as much as £4 for a single bird—a large sum in those days.†

Henry VIII.'s love of hawking is well known from the anecdote related of him in Hall's Chronicle (sub an. xvi.),‡ to the effect that being one day out hawking at Hitchin, in Hertfordshire, he was leaping a dyke with a hawking-pole, when it suddenly broke and the King was immersed head first in the mud and water, and might have lost his life, had not Edmund Moody, one of the falconers, immediately come to his assistance and dragged him out.

During the reign of Elizabeth hawking was much in vogue, particularly with the gentlemen of Cornwall and Devonshire, as we learn from Carew.§ Nichols, in his 'Progresses and Public Processions of Queen Elizabeth' (3 vols. 4to, 1788—1807), has given some interesting details concerning the Queen's participation in this and other field-sports, which want of space only prevents me from quoting.

James I., as is well known, was a most enthusiastic sportsman, and especially delighted in hawking, on which he spent considerable sums annually. As I have elsewhere given some account of his hawking establishment, and of his fishing with trained Cormorants,|| it will be unnecessary to repeat here the information which I have collected on the subject. I need only

* See Prof. Newton's remarks on these letters, Appendix to Lubbock's 'Fauna of Norfolk,' 2nd ed. p. 224.

† Bentley, 'Excerpta Historica,' p. 95.

‡ See also 'Union of the two Noble and Illustre Famelies of Lancastre and Yorke,' 2nd ed. 1558, pl. cxxxix.

§ 'The Survey of Cornwall,' 1602, folio 24.

|| 'Transactions of the Norfolk and Norwich Naturalists' Society,' vol. iii. pp. 79—94; and Dickens's 'Dictionary of the Thames,' 1879. art. Ornithology.

refer to Falconry as practised in this reign for the purpose of contradicting a statement which has been copied over and over again appears in almost every book which contains a notice of the Peregrine Falcon. It was sanctioned by Yarrell in the first edition of his 'History of British Birds,'* and is repeated even in Prof. Schlegel's great work, that author apparently having had no opportunity of testing the accuracy of a story which he was obliged to quote secondhand. The statement in question is to the effect that hawks in former days were so valuable that, in the reign of James I., Sir Thomas Monson gave £1000 for a cast—*i. e.*, for two. This is not the fact, for if we trace the story back to the original narrator of it, Sir Antony Weldon, we find the truth to be that Sir Thomas Monson spent £1000 before he succeeded in getting a perfect cast of falcons for flying at the Kite. His words are:—"Sir Thomas Monson desired to have that flight [*i. e.*, at the Kite] in all exquisiteness, and to that end was at £1000 charge in Gos Faulcons† for that flight; in all that charge [*i. e.*, after going to all that expense] he never had but one cast would performe it, and those had killed nine Kites, never missed one."‡

These were the palmy days of Hawking, when the sovereigns on both sides of the channel (James I. and Louis XIII.) were enthusiastic falconers, giving every encouragement to the sport, when the species of hawk carried was indicative of the rank of the owner, and when the best books on the subject were written by English and French masters of the craft.§

* In the fourth edition of this standard work, the Editor, with his usual acumen, has been careful to correct the mistake.

† The Gersfalcon was sometimes called Gos-falcon. It is related by Godscroft that at the Battle of Aueran Moor, in 1545, as the English and the Scots were approaching each other on a piece of low flat ground called "Panier-heugh," a Heron, roused from the marshes by the tumult, soared away between the encountering armies. "Oh!" exclaimed Angus [Archibald Douglas, seventh Earl of Angus] "that I had here my white Gos-hawk, that we might all yoke at once!"

‡ 'The Court and Character of King James,' sm. 8vo, 1650, pp. 104, 105.

§ Amongst the English works printed about this time may be mentioned George Turberville's 'Book of Falconrie' (1575, 2nd ed. 1611); Gervase Markham's 'Gentleman's Academie' (1595) and 'Country Contentments' (1611); William Grindal's 'Hawking, Hunting, Fowling, and Fishing' (1596); Simon Latham's 'Faulconry, or the Falcon's Lure and Cure' (1615, 2nd book, 1618); and Edmund Bert's 'Treatise on Hawks and Hawking' (1619); while in France appeared the equally valuable and now scarce works of Jacques de Fouilloux, Jean de Franchières, Guillaume Tardif, and D'Arcussia. The last-named writer, who frequently accompanied Louis XIII. on his hawking excursions, has left us some capital descriptions of particular flights which he witnessed.

All the Stuarts were fond of hawking, and many anecdotes might be narrated illustrative of their participation in this sport. I will confine myself to three, which refer respectively to the reigns of James I., Charles I., and Charles II.

Sir Antony Weldon relates that the French king having sent over his falconer to show some flights at the Kite, "his master falconer lay long here, but could not kill one, ours being more magnanimous than the French kite." Sir Thomas Monson, the Earl of Pembroke, and other noblemen, being not unnaturally anxious to eclipse the Frenchmen, begged the king (James I.) to go out to Royston to see a flight. The king went, and a Kite was found and flown at; but, in the words of Sir Antony Weldon, "the Kite went to such a mountee, as all the field lost sight of Kite and Hawk and all, and neither Kite nor Hawk were either seen or heard of to this present, which made all the Court conjecture it a very ill omen."

There is a curious supplement to this story, which I can hardly forbear to mention. A writer in the 'Gentleman's Magazine' for 1793 states that in the beginning of September, 1792, a paragraph appeared in several newspapers mentioning that a hawk had been found at the Cape of Good Hope, and brought from thence by one of the India ships, having on its neck a gold collar on which were engraven the following words:—

"This goodlie Hawk doth belong to his Most Excellent Majestie, James, Kinge of England. A. D. 1610."

The writer in question infers the authenticity of the inscription from Sir Antony Weldon's anecdote, and believes it must have been "the lost hawk"!*

Aubrey, in his 'Miscellanies' (p. 56, ed. 1784), says:—"When I was a freshman at Oxford, 1642, I was wont to go to Christ Church, to see King Charles I. at supper; where I once heard him say 'that as he was hawking in Scotland, he rode into the quarry, and found the covey of partridges falling upon the hawk;' and I do remember this expression further, *viz.*, 'and I will swear upon the book 'tis true.'" Aubrey adds, "When I came to my

* I need not here repeat the criticism which I have ventured to make on this passage, and which will be found in the Trans. Norf. and Norw. Nat. Soc., vol. iii., pp. 87, 88.

chamber I told this story to my tutor; said he, 'that covey was London'!*

The last anecdote I have to relate, on the authority of Sir Edward Sherborne, refers to Charles II. Not long before the death of this king, a Sparrowhawk escaped from the perch and pitched on one of the iron crowns of the White Tower, where, entangling its leash in the crown, it hung by the heels and died. Not long after another hawk pitched on one of the crowns. This was naturally regarded as a very ominous circumstance.

After the Restoration, hawking ceased to be popular, and gradually fell into disuetude, although from that time until the present it has never ceased to be practised by a few admirers of the old sport in various parts of the country. The last member of the Royal Family, I believe, who sent for or received hawks from abroad was Frederick Prince of Wales, son of George II. This prince used to occupy "the palace of Durdans," at Epsom, now the residence of the Earl of Rosebery, and used to hawk over the downs, where in 1825, according to the authors of a 'History of Epsom' published in that year, there was a spot still known as "the Hawkery."

The causes which have led to the decline of Falconry are many and various. The enclosure of waste lands, the drainage and cultivation of marshes, the great improvement in fire-arms of all kinds, and particularly the introduction of shot, have each in their way contributed to lessen the interest once so universally taken in this sport.† Fashion also, no doubt, has had a good deal to do with the decline of Hawking, for so soon as the reigning

* Although no falconer of my acquaintance can confirm the truth of this story, and the well-known timidity of the Partridge renders it well nigh incredible, instances have been known in which birds have come to the rescue of a companion attacked by a hawk. The late John Barr, one of the best professional falconers of modern times, told me that when he was falconer to the Champagne Hawking Club, (in 1866) he once flew at a Carrion Crow, one of a pair which they sighted, at Chalons, and his hawk struck it down. While the two were struggling on the ground and the crow was being killed, its companion came to the rescue, and darting down pecked at the hawk, and caused her at length to let go. The hawk, however, immediately gave chase to her assailant, and at the second stoop brought it also to the ground.

† I have elsewhere referred to a letter from Sir Edmund Bedingfeld to Lord Bath, dated in 1548, and printed in Gage's 'History of Hengrave,' which shows very clearly with what disfavour the introduction of game and wildfowl shooting was regarded by falconers. Trans. Norf. and Norw. Nat. Soc., vol. iii., pp. 81, 82.

sovereign ceased to take an interest in the sport, the courtiers and their friends followed suit.

It would not be difficult, did space here permit, to fill up the intervening gap in the history of Falconry in England, between the period to which I refer and the present time, and an interesting account might be given of the principal hawking establishments which have been maintained in the United Kingdom during the past and present centuries.

On hawking in Scotland and in Ireland two separate chapters might be written; while to give a sketch of the English poets, dramatists, and novelists who have described or touched upon hawking, and to criticise the knowledge of the subject displayed by them, would necessitate the preparation of a moderate-sized volume.

I must reluctantly leave untouched these branches of the subject, and come to the practical part of my discourse, which is to give some account of the various hawks employed by falconers; to point out the particular respects in which hawks and falcons differ; to describe the mode in which they are captured, tamed, and trained; and to indicate the particular "quarry" (as it is termed) or prey which each is flown at. Above all, bearing in mind the object of the course of lectures now in progress, I shall endeavour to show how much practical instruction may be gained upon the subject under discussion by a careful examination and comparison of the hawks and falcons now living in the Zoological Society's Gardens.

It is hardly necessary to observe that the birds under consideration all belong to the order *Accipitres*, or Birds of Prey, an order which may be regarded as the most natural in the system, because it is founded not upon a single character, but upon the general habit of the birds, in the formation of which all their leading organisations bear a part. It seems natural that the *Accipitres* should stand at the head of any system of ornithological classification, because *wings* are the grand characteristics of birds which especially distinguish them from all other vertebrated animals, and therefore those species in which the organs of flight are most highly developed may be regarded as the most typical of their class.

All birds of prey have certain characters in common which distinguish them as an order from other birds, namely, a powerful

curved beak, with the upper mandible, in the most typical species, deeply notched, and therefore well adapted for seizing and cutting up the prey; strong feet and toes, with long, curved, sharp talons for striking the prey and firmly holding it; and a specialised form of sternum or breast-bone with a deep keel for the attachment of the pectoral muscles which move the wings, and give these birds that superior power of flight which excites the wonder and admiration of all who witness it. In nearly all the species the female is larger than the male, and consequently more powerful.

The present occasion does not admit of my discussing at any length the different systems of classification which have been proposed for the birds of prey, nor of describing in detail the various modifications of structure observable in the very numerous species which are included in this order. But inasmuch as the species which are capable of being trained and employed for hawking form but a small proportion of the birds of prey, it is desirable to comprehend at the outset the position which they occupy in relation to the remaining species in the order. This will be best understood by glancing at the following tables.

Until a comparatively recent date, the order *Accipitres* was generally divided into the families *Vulturidæ*, or Vultures, characterised by their naked heads, terrestrial and sluggish habits, and predilection for carrion; *Falconidæ*, or Falcons, Hawks, Eagles, and other diurnal birds of prey, distinguished by their feathered heads, great speed upon the wing, and eminently predatory habits; and *Strigidæ*, or Owls, characterised by having the eyes directed forward instead of laterally, and by their nocturnal habits. It has been pointed out, however, by Professor Huxley, in a paper published in the 'Proceedings' of this Society (1867), that the so-called family *Vulturidæ* was an unnatural association of members of two very distinct families, *viz.*, the *Cathartidæ*, or American Vultures, on the one hand, and a group of the *Falconidæ* (the Old World Vultures), on the other. He has also shown that the Secretary-bird (*Serpentarius reptilivorus*), previously included amongst the *Falconidæ*, is in reality the sole representative of a very distinct family which he has named *Gypogeranidæ*, but which might with more simplicity have been termed *Serpentariidæ*.

He would accordingly refer the typical members of the old so-called family *Vulturidæ* to the *Falconidæ*, and divide the diurnal birds of prey into the (1) *Cathartidæ*, American Vultures, (2) *Gypætidæ*, which I should prefer to call *Falconidæ*, including the Falcons, Hawks, Eagles, and Old World Vultures, and (3) *Gypogeranidæ* (or as I would term it *Serpentariidæ*), to include the Secretary-bird.

On the present occasion we have only to deal with the second of these families (which, as I have said, I should prefer to call *Falconidæ*), and we may, therefore, dismiss the others at present from consideration.

As regards the subdivision of this family into "groups" or "subfamilies," opinions differ, and it is unnecessary on the present occasion to discuss the various views which have been expressed. On this point the student may be referred to Professor Huxley's paper, already mentioned; to Messrs. Sclater and Salvin's "*Nomenclator Avium Neotropicalium*"; Mr. Sharpe's "*Catalogue of the Accipitres in the British Museum*," with Mr. Gurney's valuable comments thereon in '*The Ibis*'; Mr. Robert Ridgway's outlines of a natural arrangement of the *Falconidæ*;* and Professor Newton's article on the genus *Falco*, in the '*Encyclopædia Britannica*.'

For our present purpose it will be most convenient to adopt the subdivision employed by Mr. Sclater in his "*List of the Vertebrated Animals*" in the gardens of this Society. This will obviate confusion, and will enable any visitor, with the "*List*" in his hand, to apply the remarks I have to offer.

Order ACCIPITRES.

Family FALCONIDÆ.

Subfamily.	Genus.	English Name.
I. Pandioninæ	Pandion	Osprey.
II. Circinæ	Circus	Harriers.
III. Buteoninæ	Buteo	} Buzzards.
"	Archibuteo	
"	Pernis	
"	Haliastur	Brahminy Kite.
"	Urubitinga	Urubitinga.
"	Geranoaetus	Chilian Sea Eagle.

* '*Bull. U. S. Geol. and Geogr. Survey of the Territories*,' second series, No. 4 (1875).

Subfamily.	Genus.	English Name.
III. Buteoninæ	Harpyhaliaetus	} Harpies.
„ (continued)	Thrasaetus	
„	Helotarsus	Bateleur Eagle.
„	Haliaetus	Sea Eagles.
„	Aquila	Typical Eagles.
„	Nisaetus	Booted and Bonelli's Eagles.
„	Spizaetus	Crested Hawk Eagles.
„	Circaetus	Short-toed Eagle.
„	Spilornis	Cheela and Bacha Eagles (India and Java).
IV. Accipitrinæ	Accipiter	Sparrow-hawks.
„	Melierax	African Zoned Hawks.
„	Astur	Goshawks.
V. Falconinæ	Falco	Typical Falcons.
„	Hypotriorchis	Hobbies
„	Hieracidea	Berigora Falcons (Australia and New Zealand).
„	Tinnunculus	Kestrels.
VI. Milvinæ	Milvus	Kites.
„	Baza	Crested Black Kite.
„	Elanus	Swallow-tailed Kites.
VII. Herpetotherinæ	Herpetotheres	Laughing Falcon (Brazil).
VIII. Polyborinæ	Polyborus	Brazilian Caracara.
„	Milvago	South American Kites.
IX. Vulturinæ	Vultur	Typical Vultures.
„	Gyps	Griffons.
„	Neophron	White Scavenger Vultures.
X. Gypohieracinæ	Gypohierax	Angolan Vulture.
XI. Gypactinæ	Gypaetus	Lammergeier.

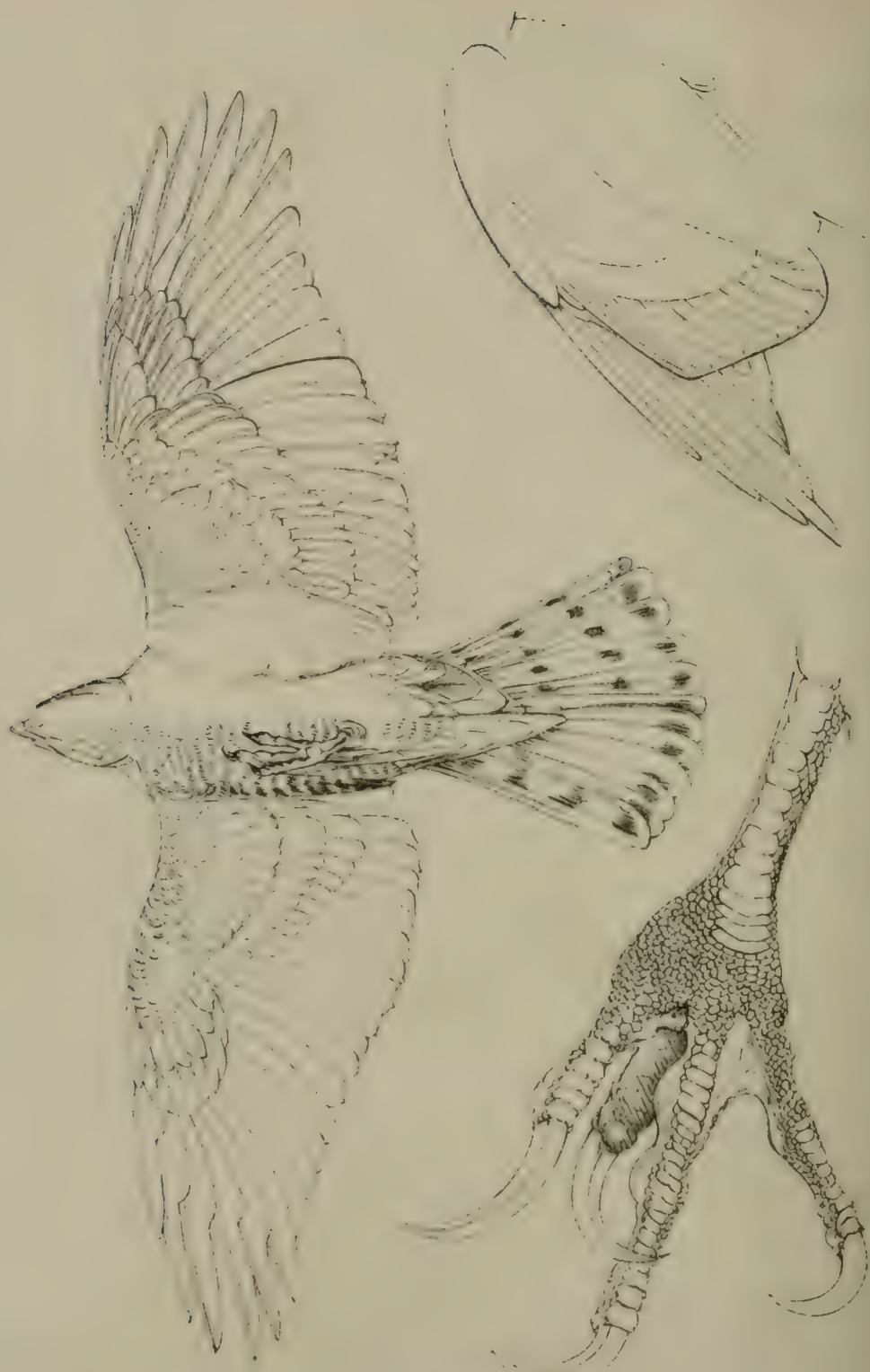
On looking over this list (which has reference only to species now or formerly living in the Society's Gardens), it will be seen that the birds used by falconers are restricted to very few sub-families.* I have marked the genus *Aquila*, because in Persia, Tartary, India, and other parts of the East, Eagles are said to be used for taking small deer, antelopes, and hares;† and there is some reason to believe that the Osprey has been trained to catch fish.‡ The Kite, although incapable of being trained, affords good sport when flown at by falcons, and so does the Kestrel. Falconers are in the habit of classifying the birds used by them as "Long-winged" and "Short-winged" Hawks, a very convenient division. To the first-named group belong all the typical

* These are printed in thicker type.

† See Sir J. Malcolm's 'Sketches of Persia'; Johnston's 'Sketches of Indian Field Sports'; Atkinson's 'Travels in Oriental and Western Siberia' and 'The Upper and Lower Amoor'; and Burton's 'Falconry in the Valley of the Indus.'

‡ See the Pell Records, pp. 219, 333.





Falcons (*Falco*), with the Hobby and Merlin and their allies (*Hypotriorchis*); the last-named comprises the Goshawks (*Astur*) and the Sparrow-hawks (*Accipiter*).

Grouping the species which have been living in the Gardens of this Society, we have the following summary, the various *habitats* being taken from Mr. Selater's 'List':—

LONG-WINGED FALCONS.

- Falco peregrinus*. Europe.
- „ *biarmicus*. South Africa.
- „ *barbarus*. North Africa.
- „ *lanarius*. Eastern Europe.
- „ *jugger*. India.
- „ *sacer*. Western Asia.
- „ *candicans*. Greenland.
- „ *islandus*. Iceland.
- Hypotriorchis subbuteo*. Europe.
- „ *vespertinus*. South Europe.
- „ *eleonoræ*. South Europe and North Africa.
- „ *æsalon*. Europe.
- „ *columbarius*. North America.
- „ *ruficularis*. South America.

SHORT-WINGED HAWKS.

- Astur palumbarius*. Europe.
- „ *tibialis*. West Africa.
- „ *approximans*. Australia.
- „ *novæ-hollandiæ*. Australia.
- Accipiter nisus*. Europe.
- „ *melanoleucus*. Africa.

Hitherto I have been using the terms “Falcon” and “Hawk” indifferently, and, generally speaking, they are regarded as synonymous terms; but I may now take an opportunity of pointing out in what respects they differ, and how they may be always known apart. A falcon has long wings, reaching, when closed, to the end of the tail, which is comparatively short and square; short thighs and tarsi, comparatively robust toes with powerful claws; and always has a dark eye. A hawk, on the other hand, has short wings, which, when closed, do not reach nearly to the end of the tail, the latter long in proportion to that of a falcon, and rounded; long thighs and slender tarsi and toes; and invariably

has a coloured eye, usually yellow or orange. The mode in which the two take their prey is very different. The long-winged falcon rises in circles until above the bird she is pursuing, and then, with half-closed wings, descends upon it with a "stoop," often from a considerable height. The short-winged hawk flies directly behind its prey, and, overtaking it by superior speed, either clutches it, or makes but a very short "stoop" to seize it. Falconers accordingly take advantage of this difference of habit, and select such "quarry" as each is capable of taking. The Peregrine will take Rooks, Crows and Magpies, Partridges, Grouse, Peewits, Curlews, and even Herons; the Jerfalcon used to be the hawk *par excellence* for Herons and Cranes; the Hobby and Merlin will take Larks well; the Goshawk is flown at Partridges, Pheasants, Wildfowl, and Rabbits; and the Sparrowhawk, which, although usually employed to catch Blackbirds and Thrushes, will (*i. e.*, the female bird will) kill Partridges like a Goshawk. In Syria it is commonly used for taking Quail.

Let us see now how these falcons and hawks are caught, and how they are tamed and trained. They may be either taken when fledged from the nest, or they may be caught after they have flown; and at any age. If taken from the nest they must be flown "at hack," as it is termed; that is to say, they must be allowed their liberty for a certain time, and fed regularly every day at the same place and at the same hour, until they are strong on the wing and able to kill "quarry" for themselves. They are then taken up, and the training commences. If caught "on passage," *i. e.*, while migrating in spring and autumn, they are treated in a different way, presently to be noticed.

In the autumn of 1877 I went to Holland for the purpose of learning the Dutch method of taking and training "passage hawks"; and an extremely interesting visit it was. As I have elsewhere described minutely what I saw,* it will only be necessary to observe here that the falconer, or rather the hawk-catcher, lies in wait for the hawks during the time they are migrating; that he attracts the attention of those passing over by means of a live pigeon, which is tethered close to a bow-net; and that the hawk, having seized the pigeon, is covered by the net, and taken alive and uninjured.

* In the Falconry columns of 'The Field,' 16th Feb. and 16th March, 1878.

Timely warning of the approach of a hawk is given by a tame Butcher-bird (the Great Grey Shrike), which, tethered close to the falconer's hut, keeps a sharp look-out, and has so keen a vision that it can detect a hawk in the air long before the latter comes within the reach of human eyes.

On being taken out of the net, gently yet firmly *by the legs*, the hawk is immediately hooded, and has a "jess," or thin leather strap, put on each leg. To the other ends of these a "swivel" is attached, and through this again is passed the "leash," by which the bird is fastened, first to a "block" of turf, and eventually to a perch. Later on a bell is attached to one leg. The hood renders it quiet, the soft jesses confine it without hurting it, the turf block prevents any injury to wings and tail when it "bates," or flutters. It is fed once a day (in the evening); the hood is not removed, but, having a large opening in front, the bird is enabled to feed *through it* while held upon the glove. It is always carried upon the left hand for convenience of "hooding," "slipping," "feeding," &c., although eastern falconers carry it on the right. By degrees the bird gets tame, and will feed upon the hand without a hood. It is then taught to jump to the fist when called, and when it will do this readily the training commences, at first with a long string fastened to the swivel (instead of the leash), and ultimately the string is dispensed with. The hawk is always flown fasting, and on one or two days before going out for the first time it is desirable to give the hawk a live bird of the kind which it is intended to fly at, so as to accustom it to its appearance, and give it confidence. On days when it cannot be flown at live "quarry" it may be exercised by being flown to the lure, a dead pigeon (or pair of wings weighted) tied at the end of a long string and whirled in the air by the falconer. Should a flight feather become broken, or injured, it is easily repaired by a process called "imping," a description of which will be found in any book on Falconry.*

I have said that hawks should be fed once a day, and it is best to accustom them to be fed in the afternoon. Peregrines and the larger falcons should have lean beef or bullock's heart

* Let me here recommend, as the best modern work on the subject, Salvin and Brodrick's 'Falconry in the British Islands,' royal octavo, published by Van Voorst. It is full of useful information, and contains coloured plates of the hawks admirably drawn from living specimens by Mr. Brodrick.

(about a third of a pound), and about every third day a pigeon or other bird for the sake of the feathers, which are essential from time to time to keep a hawk in health. All birds of prey, and some others, as Shrikes, Flycatchers, and Rooks, are in the habit of rejecting the indigestible portions of their food in the shape of pellets, called "castings." From the appearance of these the bird's condition may be judged. Hobbies, Merlins, and Sparrowhawks should, if possible, be fed on small birds and mice, or sheep's heart. Beef is too stimulating, and not easily digested by them.

It is of course impossible, within the narrow limits of a lecture like the present, to give expression to half the thoughts which crowd upon the mind in connection with the subject. I should like to have supplied some additional historical notices of Falconry in England, and to have described some of the "flights" I have witnessed with the Peregrine, Jerfalcon, Merlin, and Sparrowhawk; but time will not permit. I can only add that I trust my remarks concerning hawks may be regarded as a *plea in their favour*. They are useful to us in many ways. They are "Nature's police"; they keep down many birds, which, if allowed to become too numerous, might endanger our crops (for example, the natural prey of the Peregrine is the wild Pigeon); and they prevent a district from becoming overstocked with game, which is almost as prejudicial, in the eyes of a sportsman, as holding too little. They are capable of providing us with much amusement in the way of taming, training, and flying them; they are highly intelligent, and, if properly managed, become most gentle and docile. If gentlemen would only request their keepers to *catch* instead of *shoot* hawks (that is, assuming the liberty of these birds must be restrained), and try their hands at training them, I feel satisfied that they would derive a pleasure from the experiment far beyond their expectations.

A GERMAN VIEW OF THE FAUNA OF IRELAND.

BY ERNST FRIEDEL.*

I. DUBLIN, THE EAST END; PHŒNIX PARK AND THE ZOOLOGICAL GARDENS.

THE Phœnix Park is to Dublin what the Prater is to Vienna, or the Thiergarten to Berlin. Clement, in his 'Reisen in Irland' (Kiel, 1845), observes, "Dublin may well boast of her Phœnix Park, for there is no other in Europe to compare with it, combining as it does in its great extent extreme beauty, picturesque views, variety and undulation, and an abundance of different objects of interest." Situated on the Liffey to the west of the capital, it contains 1750 acres and has a circumference of seven English miles. Its beautiful clumps of old trees are surrounded, after the English fashion, by far-spreading grassy lawns, whose verdure, owing to the mild, damp climate of the Emerald Isle, surpasses even that of the English parks. Whole herds of cattle may be seen grazing undisturbed; for the custom of stocking the park-lands with fine cattle prevails here as in England, Holland, Belgium, and the North of France; a custom which might well be adopted in Germany also. It encourages cattle-breeding, and makes good use of the grass; while visitors, especially children, are thankful for the opportunity of a drink of fresh milk, at a small charge. Farther on I saw herds of Fallow Deer, which are very tame. The Red Deer are not much kept in Irish parks, for they soon get wild and even dangerous when only half-domesticated. The Fallow Deer is considered to have been introduced into Ireland; and this may be connected with the fact that here, as in Germany, it proves delicate, and is often subject to epidemics and great mortality after wet, cold winters. It is true that remains of the Fallow Deer have once been found at a considerable depth in a bog in Co. Antrim (as in a similar case they have been found in marl near Potsdam), but old Roman coins, modern buttons, flint implements, &c., may also be found in Irish bogs, and nothing is proved by the discovery of the remains of a single deer.

* "Thierleben und Thierpflegen in Irland. Reisebemerkungen von Ernst Friedel in Berlin." 'Der Zoologische Garten,' Jahrgang xix. 271—277, 366—375; xx. 144—149, 270—275, 309—314.

The name Phoenix Park has no reference to Zoology. True the Viceroy, Lord Chesterfield, in 1745, erected in the park, at his own expense, a column thirty feet high, with the mythical bird on its summit flapping its wings over the flames; but Lord Chesterfield was a foreigner, a "Sassenach," who had only lived eight months in the country, and did not know that the real name was *fion-whiskey*, i. e. "clear-water," from a much-frequented chalybeate spring.

Not far from this is the Zoological Garden, commonly called "the Zoo"; for although Irishmen have a greater gift of speech than Englishmen, they have in this case adopted their neighbour's short and convenient expression. The gardens, which are spacious, well-grown, and well-watered, were opened, I believe, on May 10th, 1830, thus being one of the oldest of modern institutions of the kind. As may therefore be supposed, they are burdened with the usual defects of old gardens; besides which the damp climate is injurious to both wood and mortar, making Ireland a land of ruins. The trees grow with wonderful luxuriance; the ivy is beyond description; the country is a paradise of ferns and other cryptogams; one holly stem (*Ilex aquifolium*) measured 20 centimetres in diameter. This luxuriant vegetation causes more shade and humidity than some tropical animals can bear. Hence the larger animals, as in the old London and Paris Gardens, are allowed no out-door exercise. It would be unfair, however, to deny that at the date of my visit preparations were being made for an improvement in this respect. May they be continued—not abandoned after the first attempt, as is so often the case with Irish projects.*

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The Aquarium was in better condition—in fact, quite satisfactory. It is in a particularly roomy house, and contains both salt and fresh-water tanks. It forms a long right angle, and right and left against the walls are four smaller tanks; to the left three low open tanks, into which one can look down, and to the right one large open one, with the smaller tanks against the farther wall; while in the middle of the room is an isolated aquarium, which

* Here follows an account of the animals observed in the Dublin Zoological Gardens, which, being probably well known to most of our readers, may be here omitted. The writer considered that more attention might be paid to the condition of the animals and to the cleanliness of the cages.—ED.

can be inspected from all sides. The Aquarium is constructed on Lloyd's system (not Brehm's grotto plan), and has succeeded well for many years.

Notwithstanding the length of time they have been made, the tanks look well. Those on each side of the entrance are filled with fresh water and protected from the light, so as to prevent the formation of *Alge*, which is so destructive. Amongst the animals in the tanks I noticed the Pearl Mussel (*Unio margaritifera*), which is found in many counties of Ireland, as Cork, Waterford, Donegal, Tyrone, Antrim, Wicklow, &c. It is said that in the year 1839 such immense quantities of mussels were fished up at Omagh, County Tyrone, that the country people crushed them and used them as manure. No particular profit seems to be derived from the pearls. The specimens in the Dublin Aquarium have been living there since April, 1872, thus proving how well the water is cared for, since *Unios* do not usually live long in aquaria.

I was struck by the thousands of Minnows (*Leuciscus phoxinus*), the more so as this fish has only of late years been introduced into Ireland, and is as yet only found in the rivers of Dublin and Wicklow. The same with the Carp, which is not indigenous there any more than it is in England and Scotland, and is still so rare, or so little known, in Ireland that Thompson, in his 'Natural History of Ireland,' has carefully noted each locality. The true reason for this may be that in an island like Ireland, well supplied with every variety of sea-fish, including the finest *Salmonide*, fresh-water fish are but little valued, and seldom caught or eaten. I have found the like in England, Scotland, and on the sea-board of North America. The Barbel, so well known to Thames anglers, is not found in Ireland. Dr. P. Browne's Catalogue, which mentions it, without citing proof, as having been observed in 1744, is utterly untrustworthy. Farther on I noticed a Tench, which fish is said to have been introduced here, as in Great Britain. Also *Cobitis tania* and *C. barbatula*; *C. fossilis*, on the contrary, is missing here, as it is all through the island. *Gasterosteus aculeatus* and *G. leiurus* were observed. The Ten-spined Stickleback (*G. pungitius*), found in Massachusetts, North America, is only local in Ireland, as with us, but is there in great numbers, and in the merest puddles. I was also interested in the Bull-frog (*Rana mugiens*), from Nova Scotia.

Associated with the Gasteropods were Cray-fish (*Astacus fluviatilis*), also introduced into Ireland, probably towards the end of the last century, and therefore by no means generally distributed, though common in certain places. Amongst the Mollusca I noticed a very large *Pinna ingens*, from the west coast of Ireland, and various kinds of Plaice, Burbot, Bream, &c. The Asteroids included fine specimens of *Anthea cereus*, Johnst., the beautiful *Adamsia maculata*, Johnst., *Actinia mesembryanthemum*, Ellis, *A. coccinia*, Müll., *Zealia crassicornis*, &c.

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The Dublin Fish Market was not so well stocked as I expected. Many shell-fish are eaten; besides oysters, there are the large *Cardium*, *Pholas*, *Mya*, *Mytilus*, *Patella*, *Litorina*, *Fusus*, *Buccinum*. The mussels are eaten raw, the whelks cooked.

Very remarkable bird-cages are used here. The actual cage forms a mill-wheel of trellis-work, which is fastened on a semicircle of wire, and turns round like our squirrels' wheels when the bird hops on to the step. A tin boat with flags is fastened under the wheel, so that the whole reminds one of a miniature steamboat. Little cages with movable wheels, like the squirrel-cages already mentioned, are also used here for white mice.

(To be continued.)

OCCASIONAL NOTES.

GREAT BUSTARD IN ESSEX.—I have only lately seen the last few numbers of 'The Zoologist,' and write to say that Mr. Harting is perfectly correct in stating (p. 144) that the bird referred to by Mr. Travis is the same as Mr. Smoother's specimen. To speak more correctly, however, I believe the locality should be close to Hull Bridge, on the River Crouch, at Woodham Ferrers. This is the only bird actually shot in the county that I have seen; but at the meeting of the Essex Naturalists' Club at which my paper was read, Mr. Fitch is reported to have said that he had "heard of two other specimens in Essex this winter, one at Manningtree and one at Maldon." I have been unable to obtain particulars of these, and have nowhere seen their capture recorded. It is very desirable that some further information should be obtained. I have had the pleasure of examining both the Woodham and the West Wickham specimens. They

are both females, and very closely resemble one another, the only difference being in the intensity of some of the colours, in which I think the former had slightly the advantage.—R. M. CHRISTY (Saffron Walden).

ORNITHOLOGICAL NOTES FROM ORKNEY.—Between May 18th and June 14th the following birds were observed by me in Orkney:—Several Marsh Harriers, which were very wary; their cry is peculiar, something like that of a Peacock, uttered in a higher key and slower; some of their eggs found by the boys on the moors were quite fresh. The Wheatear was very common; most of them were sitting, but some had young ones. Of the Common Wren and Pied Wagtail I saw but few. Several Meadow Pipits were observed and nests found, some with young, and some with fresh-laid eggs; but this bird is nowhere numerous in Orkney. The Rock Pipit, on the other hand, is common by the sea on the steep cliffs, where it builds; I found three nests, one with five eggs quite fresh, the others with young ones. The Sky Lark and the Common Bunting are everywhere abundant; the latter might be seen by every farmstead or cottage; it is called “Throstle-cock” by the natives, and does not build till June. The Yellow Bunting was occasionally seen, as also the Linnet. The Twite was common: I found several nests with young or with eggs hard-sat; they were built in heather, especially among the cliffs near the sea. The House Sparrow was as common in Orkney as elsewhere. I saw several Hooded Crows and a few Rooks’ nests at Kirkwall. The Cuckoo was once heard. The Rock Dove breeds in the cliffs. The Golden Plover was common, and at the date of my visit sitting. The Lapwing was everywhere abundant, and the young hatched. The Ringed Plover was equally abundant, breeding by the sides of lochs and tarns in gravelly places, sometimes at some distance from water in stony paths, but making no nest; the eggs were just hatching. The Redshank was very common, and just hatching; it breeds in tufts of grass in waste places on the moors: the old birds were very noisy. The Common Sandpiper did not seem to be very common: I found one nest at the bottom of a stone wall on a small island; the eggs were quite fresh on May 25th. The Dunlin was common enough, breeding generally near water in heather or grass: the eggs were fresh about May 17th. I found a few nests with fresh eggs of the Common Snipe. The Curlew, Landrail, Moorhen, Coot, and Wild Duck were all observed: the last named had fresh eggs. I saw several Widgeon, and found several nests of the Eider Duck in heather near the sea; the eggs fresh, and the nests contained a quantity of down. Gulls, as might be supposed, were very numerous. There are but few trees on the island, which may account for the scarcity of Thrushes and Blackbirds. I did not hear a Warbler or see either a Swallow or Robin.—H. G. TOMLINSON (The Woodlands, Burton-on-Trent).

CUCKOO DENUDED OF FEATHERS.—In Mr. Kermode's note (p. 257) on the Cuckoo found in the Isle of Man, the extent to which that bird was denuded of feathers is not recorded. I have frequently noticed that when a Cuckoo is shot and falls from the height of a few feet it loses nearly all the feathers from the back and upper tail-coverts, and sometimes also from the breast and sides. These feathers are very stiff and but slightly fixed in a very thin papery skin, so that a sudden blow or shock separates them easily from the skin. I have seen this happen even when the bird fell on a grassy meadow, and can imagine that if a Cuckoo was knocked down from a considerable height, either by shot or by a blow from a hawk, and fell on hard ground or on a hard peat-stack (as in the Isle of Man) the bird might be found much more denuded than those which I have seen. This easy separation of feathers from the Cuckoo makes it a very difficult bird to stuff, or even to make into a good skin. The Nightjar is much the same in this respect, but is too light a weight in proportion to its size to lose so many feathers on falling. Ring Doves on falling from a great height are apt to lose many feathers from the upper tail-coverts and flanks; but I have noticed this loss to a much greater extent and more invariably in the Cuckoo than in any other bird.—FRANK NORGATE (Sparham, Norwich).

[See Willughby's 'Ornithology,' p. 98.—Ed.]

BIRDS' FEATHERS COMING OFF IN WINTER.—Mr. Philip M. C. Kermode refers to Cuckoos denuded of feathers (p. 257), and asks "Has the like been observed of any other bird?" The only instance I can recall was one which Mr. Seebohm and I met with. On March 24th, 1875 (not the 14th, as stated in 'Annals and Mag. Nat. Hist.,' July, 1877, p. 124), I shot a Hawfinch, *Coccothraustes vulgaris*, in the German Cemetery at Archangel. Its feathers were so loose that they came off at a touch, and we could not preserve the specimen, which was unfortunate, as it was the only one ever recorded as occurring at Archangel. From my journal I find that no disease was apparent externally or on dissection. The bird had been feeding on rye or some grain picked up at the bottom of the windmills.—J. A. HARVIE BROWN (Dunipace House, Larbert, N.B.)

HOOPOE NEAR BASINGSTOKE.—On the morning of May 12th I was called to the window to look at an "odd bird," which was feeding on the Rectory lawn, and which I recognised as the Hoopoe, *Upupa epops*, whose barred plumage, orange breast, and orange crest, which it was raising, in alarm or defiance perhaps, at some Thrushes feeding at a respectful distance from it, made it a splendid object in the sunshine. My exclamations of astonishment and delight proved unfortunately too much for our strange visitor, who, to our great disappointment took flight, but only, as it turned out, to the precincts of the Manor House opposite, which it haunted for three days. During this time we were able, with the aid of a field-glass, to see a good deal of

our *rara avis*, whose chief object during its stay seemed to be to provision for some further flight, judging from the rapidity with which it fed and the eagerness and pertinacity with which it returned to the lawn after every fresh alarm caused by the advances of its admirers. I hear that one was seen some few years ago also in this immediate neighbourhood. I have followed the striking note of this shy bird in vain for a mile or two over marshy meadows in the wilds of Pomerania, only to hear it calling more and more faintly in the distance; but "all things come to those who know how to wait," and here it arrives at our very door. In those regions it is called "Der Kuckuck sein Küster" (the Cuckoo's clerk), from its appearance a fortnight before the arrival of the Cuckoo, to announce, as they say, his coming.—M. CARROW (Dummer Rectory, Basingstoke).

HOOPOES IN SUSSEX AND KENT.—I saw one of these birds close to me on April 17th, just outside Stanmer Park, in Sussex. Another, which I saw in the flesh, was killed on or about the 16th, near Hurstpierpoint; and a third at Longfield, near Gravesend, on or about April 14th. Is not this full early for them? I saw three male and one female Grey-headed Wagtails, at Brighton, which had all been obtained on the outskirts of that town. They were in splendid plumage, and quite fresh. Also a Common Tern, shot on a pond at Crawley about the middle of April.—CLIFTON (Cobham, Kent.)

HOOPOE NEAR CHICHESTER.—On April 24th a specimen of the Hoopoe was on our lawn for several hours. I resisted entreaties to have it shot, and, as I hear it is still in the neighbourhood, I hope others will follow my example, for I think such rare birds ought to be protected.—CARRINGTON FRANCIS SIZER (St. Mary's, Great Bentley, Colchester).

[We quite agree with our correspondent's view, and should be glad to think that his example will be followed.—ED.]

UNUSUAL NEST OF EGGS OF THE WATERHEN.—During an excursion to Strensall Common last spring, I came across a nest of this bird containing twenty-six eggs, an extraordinary number, the usual complement being eight or nine, although I have occasionally found as many as eleven, and once twelve in one nest. The eggs were in three distinct batches: seven or eight were very similar, being of a warm stone colour, thickly marked with large, rich brown spots. Another lot were considerably smaller, and were very slightly freckled with dark red; while the third batch differed entirely from either of the preceding. I have specimens of all the three varieties in my collection. I think this is sufficient proof that three Waterhens must have laid their eggs in one nest—an instance which I think has never been known to occur before. It is not unusual to find Partridges and Pheasants laying their eggs together. The nest now referred to was as large as, and similar to, that of the Coot. It would be

interesting to know whether the three birds took their share in incubation, or whether the original owner of the nest was left in charge of the whole twenty-six eggs. I have frequently found the Waterhen's nest in trees. Last year I found one containing eggs in a holly tree about twelve feet above the ground. I found another in a tree near the same place, which must have been upwards of forty feet above the ground. I have examined scores of Waterhens' eggs, and find that they do not differ much in their general appearance; but I once found a nest containing eggs which were beautifully streaked after the manner of a Bunting's egg.—WALTER RAINE (Leeds).

BLACK-WINGED STILT NEAR EASTBOURNE.—On May 6th, in the marshes between Eastbourne and Polegate, my attention was attracted to my fox-terrier, who was pursuing a large bird along a ditch, where the bird had evidently been feeding. It ran with long strides for a few yards, and then rose into the air and flew close past me, and at the height of about four feet only from the ground. I saw at once, by its great length of leg, black and white plumage, and flight, that it was a Stilt—certainly a scarce species nowadays in this country. The bird appeared very tired, as it only flew some two hundred yards, alighting in a deep ditch, amongst long rushes, whence I did not again dislodge it.—ALEXANDER CLARK KENNEDY, late Coldstream Guards (Eastbourne).

"WARIANGLE" AND "NYNMURDER," NAMES FOR THE BUTCHER BIRD.—With reference to the remarks which have appeared upon this subject (Zool. 1879, pp. 404, note, and 488), it may be observed that an explanation of both these names is given by Willughby, in his 'Ornithology' (p. 87). Under the head of "The Greater Butcher-bird or Mattagess," he writes:—"This bird in the North of England is called *Wierangle*, a name, it seems, common to us with the Germans, who (as Gesner witnesseth) about Strassburgh, Franckfort, and elsewhere, call it *Werkengel* or *Warkangel*, perchance (saith he) as it were *Wurchangel*, which literally rendered signifies 'a suffocating angel.' In other parts of Germany it is called *Neghen-doer*, that is 'Nine-killer' [*Enneoctonos*], because it kills nine birds before it ceases, or every day nine. Our falconers call it the *Mattagess*, a name borrowed from the Savoyards, which is by Aldrovandus interpreted 'a murdering pie.'" As regards the last-mentioned, compare the names cited by Rolland, 'Faune Populaire de la France' (Oiseaux), pp. 131, 132, 150, 151.—J. E. HARTING.

PEREGRINE FALCONS ON SALISBURY CATHEDRAL SPIRE.—During the first week of May I saw several times a pair of these fine birds flying round the cathedral spire and perching upon its pinnacles. Their cries were constant and unmistakable, and attracted my attention the first time that

I came near the cathedral, though it was not until the next morning that I was gratified by seeing them. Every precaution has been taken, I understand, to prevent these birds being molested, so that we may confidently expect a brood to be hatched and reared there in due time.—O. PICKARD CAMBRIDGE (Bloxworth Rectory, Dorset).

UNUSUAL NESTING-PLACE OF THE WHEATEAR.—During an ornithological ramble to Adel last spring, I obtained eggs of a Wheatear from a hole in a bank which overhangs one of our beautiful streams. The hole was once the nesting-place of a Sand Martin. The nest was placed at the far end of the hole, which was about three feet in length. I know of only one other such instance on record—namely, that given by Hewitson, in his ‘Eggs of British Birds.’ At the same time I procured eggs of the Dipper from a boy who had found them near the same stream a few days previously. He discovered the old bird on the nest, and took bird, nest and five eggs. He kept the bird in a cage for some time, but being unable to obtain food for it he was persuaded to let it go, and not knowing the value of the nest, destroyed it. The Dipper’s nest is seldom found in this neighbourhood.—WALTER RAINE (Leeds).

A STRANGE NESTING COMMUNITY.—In an elm tree in a hedgerow near Shoburness, in Essex, my friend Capt. W. Hubback, Royal Artillery, was shown the following most extraordinary collection of nests:—In a fork on one side of the tree was that of a Kestrel, containing six eggs, from which one of the old birds was dislodged; high up on the main stem a pair of Carrion Crows had made theirs, which held three eggs; and half-way up, among the small twigs against the trunk, the flimsy construction of the Ring Dove was placed, with two much incubated eggs. This was on the 6th May last. Why these widely-different species had all been attracted to this one particular tree is hard to imagine. There were hundreds of similar trees in the immediate vicinity, but no nests.—SAVILE J. REID, Capt. R.E. (Brompton Barracks, Chatham).

SNOW BUNTING AT CROMER IN MAY.—I was much surprised to see a Snow Bunting on the beach at Cromer on May 10th. It was flying about in company with a Sparrow, and appeared very tame indeed. Is not this an unusually late appearance of this bird?—CHARLES W. BENSON (Rathmines School, Dublin).

WOODCOCK BREEDING IN HERTFORDSHIRE.—It may be interesting to some of your readers to know that a nest of Woodcocks has safely come off on Hertford Heath, not two hundred yards from the College grounds. I had heard that the old bird with two or three young ones had been seen several times on the heath, and on the evening of May 25th had the pleasure of examining one of the young ones. It was nearly full grown,

and could fly fairly well. Of course I let it go again. It is quite a wonder that the bird was not disturbed while sitting, as the heath is public, and is disturbed from morn till eve by boys in search of nests. I am quite aware that the Woodcock breeds in many counties in England, but do not know whether Hertfordshire has been added to the list.—M. VAUGHAN (Haileybury College).

WOODCOCK NESTING IN LANCASHIRE.—On May 20th, while walking in the outskirts of an extensive wood here, I was much surprised by seeing four Woodcocks rise from under some brushwood. One of them lingered an instant behind the rest, and gave me an opportunity of seeing that it was full grown and in complete plumage. I have heard from gamekeepers that nests have been occasionally found in this neighbourhood; but this date seems early for full-grown young birds.—JAMES MURTON (Highfield, Silverdale, near Carnforth).

CRESTED LARK IN CORNWALL.—On June 12th I shot a Crested Lark, *Alauda cristata*, in our garden, and have sent it to Mr. Vingoe, our Cornish naturalist, to be set up. He has advised me to send you this notice. He says the bird is a female, as he found eggs in the ovary.—HERBERT P. HART (Polbrean, Lizard, Helston).

[This makes the fifth instance in which the Crested Lark has been met with in Cornwall. Particulars of previous captures will be found in Rodd's 'Birds of Cornwall and the Scilly Isles,' p. 50.—ED.]

NATURAL-HISTORY NOTES FROM LERWICK.—There is nothing of special interest here at present to communicate in relation to Ornithology, except the fact that, owing to the mild weather during winter and early spring, the birds have nested earlier this year than usual. A pair of Ravens had their young out about the middle of April, in one instance under my own observation. The Great Black-backed Gull nested on the 1st of May in the lochs, as also several of the small gulls. A pair of Swallows were seen about here for some weeks prior to this date (May 26th), but no appearance of nesting as yet. An unusual quantity of Ducks visited us during the winter, but almost all left here by May 26th. I observed the first pair of Arctic Terns on the 22nd May, flying high and in an uneasy manner round the nesting site; they seemed to have just newly arrived from the north. I found a fine specimen of the Sea-mouse the other day on the beach of the loch Clickiwin, near Lerwick; it was quite fresh, and must have been newly carried there by a bird, who, finding it impossible to swallow such a rough morsel, had dropped it on the margin of the loch. The animal was four inches long, dusky grey on the back, studded with sharp bristles. The hair on the sides was of a brilliant green colour, tinged with yellow. I counted sixty four feet, but might have missed some of the smaller ones, as they diminish in size towards the tail. It is an inhabitant of deep water, and is

sometimes found in the stomachs of cod caught far out at sea, which makes the finding of it on the shore of a fresh-water loch rather interesting.—J. T. GARRIOCK (Prospect House, Lerwick).

SCOMBER PUNCTATUS ON THE CORNISH COAST.—On the 21st of April I received from my kind friend Mr. Matthias Dunn, of Mevagissey, a beautiful and fresh example of Couch's "Dotted Mackarel," a most welcome addition to my collection of British fishes, as I have long been desirous of investigating the different species. Pennant (1776) and Fleming (1828) only record the "Common Mackarel" from the British Isles; Turton (1807) adds the "Spanish Mackarel," *Scomber colias*, which is also included by Jenyns (1835), Yarrell, White (1851), and Thompson (1856), the three last authors considering *Scomber maculatus*, Couch, the same as *S. colias*. Couch, however, recorded both the forms admitted by his predecessors, and also the "Dotted" and the "Scribbled" Mackarels. Dr. Günther, in his 'Catalogue of Fishes' (1860), places the "Dotted Mackarel," *Scomber punctatus*, as a doubtful species on which he offers no opinion, while Couch's *S. scriptus* had not been described at that time. Couch's example of "Dotted Mackarel" was a female, $15\frac{1}{2}$ inches long, taken in Cornwall, July, 1848; it is said to have differed from the common form in that "the jaws were more decidedly of equal length," the sides and belly more distinctly scaled, no air-bladder. His "Scribbled Mackarel," of which he obtained three examples, were also deficient in air-bladders, while a rise was noted as existing at the snout and another at the occiput, and the lateral line was stated to be smooth, not zigzag. The chief difference seems to have been in the colours. It must be remarked that the "Spanish Mackarel" possesses an air-bladder, although Couch could not find it, while he likewise stated it to be absent both in his "Dotted" and "Scribbled" species. Sir John Richardson, when editing the third edition of Yarrell's 'British Fishes,' admitted the "Dotted Mackarel," but doubted if further anatomical investigation would or would not permit of its being retained as a distinct species. The example I have received is a female in which the ova are not quite ripe; it possesses twelve spines in its first, and one spine and eleven rays in its second, dorsal fin, and also five finlets; its anal has one spine, eleven rays, and five finlets—no air-bladder. Having no air-bladder, it cannot be the Spanish Mackarel or the Mediterranean *Scomber pneumatophorus*, leaving for consideration whether it may be a variety of the Common Mackarel. In the number of its rays and scales, and also in its proportions, it is identical with the Common Mackarel, except being slightly wider between the eyes. This, however, is liable to variation, as I have lately received two American examples from the Cambridge Museum, Massachusetts, in which I perceive the interorbital width intermediate between

my British specimens and what I find in the "Dotted Mackarel," which is an interesting variety of the Common Mackarel. It is exceedingly fortunate that we have such an excellent observer on the coast as Mr. Dunn, and much to be regretted that those having similar opportunities at Brixham, and elsewhere, do not in like manner take notice of rarities as they occur.—FRANCIS DAY (Kenilworth House, Pittville, Cheltenham).

FOOD OF SEA FISHES: WHITING AND WHITING-POUT.—The Whiting, *Merlangus vulgaris*, and the Whiting-pout, *Morrhua lusca*, although so closely allied in name, are in their habitat and feeding quite distinct, the former of which is considered the more delicate of the two, but whether it is on account of the food devoured by the latter, the flavour in my idea surpasses the Whiting proper, which is most decidedly very delicately flavoured, and out of many thousands that have been disembowelled by myself it has seldom occurred that I have come across any Crustacea enclosed therein, excepting in May, 1873. A Whiting of six pounds weight was forwarded to me from Teignmouth, in which I found a female Broad-tailed Lobster, *Scyllurus arctus*, a perfect specimen, and very rare on this coast; and which can now be seen in the Albert Memorial Museum, along with a splendid male specimen which was taken by myself the following week from a codfish captured in Torbay. But as a rule the food of Whittings depends much upon the seasons, such as Sprats, Herrings, Pilchards, &c. At the present time (December) Sprats and Herrings (pieces of herring make most killing bait) is the principal substance contained in their maws. In the spring they contain a thick fluid resembling that taken from the Mount's Bay Mackarel when in season, which is very much like anchovy sauce; but what it is composed of I never could make out. I fancy it must be either shrimps or prawns. It is very destructive to the stomachs of those fish that partake of it, occasioning them to burst and become unsaleable in a very short time after leaving their native element. The Whiting-pout, Bib, Brassy, or as it is sometimes called the "Stink Alive," of all fish, for inspection gives the greatest variety of food and curios. I know these fish are great gourmands, excellent scavengers, and are found more among rocks and old wrecks, and the more unapproachable places for many other kinds of fish, the Wrasse, Dory, and Boar-fish excepted. The Whiting-pout has also a barbule, beard, or feeder, which the true Whiting has not; which proves to me that they live as a rule nearer the bottom of the ocean than the Whiting, which has no such appendage. Among the many kinds of substances found in the stomachs of these fish, I may call attention to the following Crustacea, which are really worth mentioning; most of them, like the above Broad-tailed Lobster, can be seen in the Albert Memorial Museum, Exeter, where I presented them with several of the following:—Montagu's Crab, *Xantho*

florida; Angled Crab, *Gonoplax Angulata*; Velvet Fiddler Crab, *Portunus depressa*; Hermit Crab, *Pagurus bernhardus*; Pea Crab, *Pinnotheres pisum*; Spider Crab, *Cancer pagurus*; *Stenorhynchus tenuirostris*; *Porcellanus longicornis*; Olive Squat Lobster, *Galathea squamifera*; *Stenorhynchus phalangium*; *Eurynome aspersa*; *Xantho riolosa*.—FRANK GOSDEN, in 'Land and Water.'

THE FAUNA OF BELFAST LOUGH.—Mr. David Bogue has now at press and will shortly publish a work on the 'Birds, Fishes, and Cetacea of Belfast Lough,' by Mr. R. Lloyd Patterson, Vice-President of Belfast Natural History Society and President of Belfast Chamber of Commerce.

PROCEEDINGS OF SCIENTIFIC SOCIETIES.

ZOOLOGICAL SOCIETY OF LONDON.

June 1, 1880.—Professor W. H. FLOWER, LL.D., F.R.S., President, in the chair.

Mr. Sclater made some remarks on the principal objects he had noticed during a recent inspection of the Zoological Gardens of Berlin, Hamburg, Amsterdam, the Hague, and Antwerp.

The Secretary exhibited a spider of the genus *Tegenaria*, which had been forwarded to him from Cape Town, by Mr. J. H. Payne, of that place. It had been taken within three miles of Cape Town, on the back of a horse which had subsequently died, as it was said, from the effects of the bite.

Mr. G. E. Dobson exhibited some new and rare species of Bats, amongst which was an example of a new species of the genus *Megaderma*, from Australia, proposed to be called *Megaderma gigas*, and remarkable for its large size.

Mr. Dobson made some further remarks as to the date of the receipt of the Dodo bones exhibited by him at a former meeting.

Lord Lilford exhibited and made remarks on some nests and eggs of the Flamingo, which had been taken in the marshes of the Guadalquivir, below Seville, in April, 1879.

Lord Lilford also exhibited some fine Hybrid Pheasants, between males of Reeves' Pheasant and hens of the Common Pheasant.

Mr. E. W. H. Holdsworth read a note on the distribution of the Crayfish (*Astacus*) in Spain.

Prof. F. Jeffrey Bell read a paper on some species and genera of the *Temnopleuridae*, in the course of which he described the method he had adopted in comparing different species, and species at different stages in growth. He also directed special attention to the differences in the size of the

generation pores in *Amblypneustes formosus*, and discussed the specific characters of *Salmacis globator*.

A communication was read from Dr. A. Günther, containing notes on a collection of Mammals from Japan.

Mr. G. E. Dobson read a description of a new species of Bat, of the genus *Natalus*, from Jamaica, which he proposed to name *N. micropus*.

Mr. A. W. E. O'Shaughnessy read the description of a new species of Lizard of the genus *Uromastix*, from Zanzibar, which he proposed to call *U. princeps*.

June 15, 1880.—Professor W. H. FLOWER, LL.D., F.R.S., President, in the chair.

The Secretary read a report on the additions that had been made to the Society's Menagerie during the month of May, 1810, and called special attention to several novelties, amongst which were:—Two Side-striped Jackals, *Canis lateralis*, acquired by purchase May 28th. Only one example of this rare species had been previously received by the Society. A young male Lühdorf's Deer, *Cervus Lühdorfi*, born in the Zoological Gardens of Hamburg, and new to the collection. Lühdorf's Deer is a newly discovered species, allied to the Wapiti, from Amoorland.

The Secretary exhibited the skin of an Antelope received from the Gaboon, and remarked that it appeared to belong to the female of an undescribed species of *Tragelaphus*, allied to *Tragelaphus Spekii*, which he proposed to name *T. gratus*.

Dr. A. Günther exhibited and made remarks on a series of horns of the Sambar Deer of Borneo.

Mr. W. T. Blanford made some remarks on the proper name of the Himalayan Marmots, now living in the Society's Gardens, which he believed to be *Arctomys Hodgsoni*.

Professor Mivart called attention to the fresh-water *Medusæ*, now living in the Victoria Lily House, in the Botanic Gardens, Regent's Park.

Mr. Edward R. Alston read a paper "On *Antechinomys* and its Allies," in which he described the anatomy of that little-known Marsupial. He regarded the four genera *Phascologale*, *Antechinus*, *Podabrus*, and *Antechinomys*, as constituting a subfamily of the *Dasyuridæ*, the first and the second, and the third and fourth, being most nearly related to one another.

Mr. G. E. Dobson read a paper on some new or rare species of Chiroptera in the collection of the Göttingen Museum. Amongst these was a new species of *Megaderma* from Australia, which, on account of its large size, Mr. Dobson proposed to name *Megaderma gigas*.

Mr. W. A. Forbes read a paper on the anatomy of *Leptosoma discolor*, and adduced further evidence to show that this bird is related, not to the Cuckoos (*Cuculidæ*), but to the Rollers (*Coraciidæ*).

A second paper by Mr. Forbes contained remarks on two rare Ploceine birds in the Society's collection (*Vidua splendens* and *Pytelia Wieneri*).

Mr. Forbes likewise read some notes on the anatomy of a male Denham's Bustard, lately living in the Society's Gardens, and on its mode of "showing off" when alive.

Mr. Edgar A. Smith read the descriptions of twelve new species of shells from various localities. Specimens of all but two were in the collection of the British Museum.

Sir Walter Elliot, K.C.S.I., read some notes on the Indian Bustard, and its manner of "showing off," as observed by him in India.

Mr. F. H. Waterhouse read a list of the dates of publication of the several parts of Sir Andrew Smith's 'Illustrations of the Zoology of South Africa.'

Mr. A. W. E. O'Shaugnessy read the description of a new species of Lizard of the genus *Anolis*, from Ecuador, which he proposed to call *Anolis Buckleyi*, after its discoverer, Mr. Clarence Buckley.

Mr. Sclater read a paper containing a list of the certainly-known species of *Anatidæ*, with notes on such as have been introduced into the Zoological Gardens of Europe.

Mr. William Powell read some notes on the habits of the Mooruk, *Casuaricus Bennetti*, of New Britain.

This meeting closes the present session. There will be no more scientific meetings until the commencement of the session 1880-81, in November next.—P. L. SCLATER, *Secretary*.

ENTOMOLOGICAL SOCIETY OF LONDON.

June 2, 1880.—Sir JOHN LUBBOCK, Bart., M.P., F.R.S., &c., President, in the chair.

Miss Georgiana Ormerod, of Dunster Lodge, Spring Grove, Isleworth, and Mr. Henry Lupton, of the Elms, Chapel Allerton, Leeds, were ballotted for and elected Ordinary Members.

Mr. M. J. Walhouse exhibited a collection of moths from Mangalore, on the Malabar coast, India. Many of the species showed a great resemblance to European forms.

Mr. J. A. Finzi exhibited, on behalf of Mr. Lowrey, a bred specimen of *Arctia fuliginosa*, with only one antenna.

Sir John Lubbock stated that he had occasionally bred ants with only one antenna, and on one occasion had possessed a specimen with no antennæ at all, this individual being completely helpless when out of the nest.

The President also exhibited specimens of a new Australian ant which he had received from Mr. Waller, and which agreed with the remarkable

genus *Myrmecocystus* of Wesmael in having an immensely distended abdomen, so that the insect actually serves as an animated honey-pot. The present species, however, belongs to a different genus, and is allied to *Camponotus*.

The Rev. H. S. Gorham communicated the concluding portion of his "Materials for a Revision of the *Lampyridæ*."—R. MELDOLA, *Hon. Sec.*

NOTICES OF NEW BOOKS.

A History of the British Marine Polyzoa. By the REV. THOMAS HINCKS, B.A., F.R.S. 2 vols., 8vo. J. Van Voorst. 1880.

THIS volume, which has been expected for some time, will be welcomed by those interested in the study of this group, and workers will now find their labours much lessened, for the literature on the British Bryozoa, being widely scattered in various periodicals, has made the study very laborious. The book which up to the present time has been used in the determination of species has been Busk's British Museum catalogue, but since this was published, many new species have been discovered in the British seas, and several important works on recent forms from European and American waters have appeared; besides which great advances in the physiology and embryology have been made by Smitt, Nitsch, Joliet, and Barrois, and therefore a first class manual like the one before us should attract many workers, where it will be seen there is still much to be done.

The introduction of one hundred and thirty-five pages gives an elaborate and full account of the structure and physiology, and is thoroughly scientific in giving the results obtained by others with great fairness. Those who have seen Mr. Hincks's previous papers will not be surprised to find so good a worker boldly acknowledging a change of opinion when that which he previously advocated has, upon wider study, proved incorrect (as is the case with the so-called "colonial nervous system" or endosarc); and again, the account of the so-called "brown bodies" fairly represents the changes that have taken place since he first took part in the discussion respecting them.

The Bryozoa, with the exception of *Loxosoma*, occur as colonies, in which each Bryozoon consists of the zoecium or

“chamber,” in which the polypide is lodged. In a colony a large number of zoœcia are without polypides, as the life of the polypide is often short, whereas the colony may have a very long life. When a polypide disappears, it is replaced by a “brown body,” and this has given rise to much discussion and a large amount of published speculation.

It is now, however, universally recognised that it is derived from the polypide, and is the result of its decline; but Mr. Hincks has some hesitation in following Joliet in his opinion that this brown body is without reproductive function, and, although the evidence against this is very strong, lays much stress on the fact that the second crop of polypides, where developed from the brown body, have at first a reddish brown colour, which is wanting in the polypides of young marginal cells.

Much discussion has also arisen concerning another tissue, now called the endosarc, shown to be derived from the endocyst, and which is seen under various forms, sometimes most clearly as the “funiculus,” attached to the base of the stomach of the polypide and passing down to the bottom of the cell.

In some, as *Zoobotryon pellucidus*, the endosarc passes as a connective cord along the stolon, and gives off a branch to each polypide; in others it is seen near the back or dorsal surface of the zoœcium, extending down its walls, and in contact with each of the “communication-plates,” showing in several respects great variation according to the mode of growth of the species. Müller, Smitt, Clararède, Hincks—all adopted the view that this was a colonial nervous system; but Joliet clearly demonstrated the incorrectness of this interpretation, and Mr. Hincks now recognises the value of Joliet’s evidence.

We do not think Mr. Hincks has been fortunate in his choice of woodcuts to illustrate this point, for Reichert’s figures must be looked upon as incorrect diagrammatic elaborations, and fig. xv. (which is unconsciously somewhat improved) is probably taken from *Zoobotryon* in an abnormal, perhaps we may say enfeebled, condition; nor is it one of Reichert’s most characteristic figures.

Probably it will be found that the above remarks apply to most of the figures which have appeared of *Zoobotryon*, and instead of one thick cord a large number of thin threads, placed together as a bundle, and frequently anastomosing, should be

represented. In other species, where the endosarcial cord appears more solid than in *Zoobotryon*, careful examination will sometimes show that it consists of various threads. On the funiculus, which is a part of the endosarc, the spermary is developed, and also, in a large proportion of cases if not universally, both the ovary and polypide.

Mr. Hincks devotes some space to a discussion of Joliet's views on this question, and to observations made prior to Joliet's discovery, some of which, he considers, render further examination necessary in a large number of species. This structure must now be considered of primary importance.

Mr. Hincks has adopted a much modified classification, which will certainly be hailed as a great improvement on the previous arrangement of the British forms. The first attempt at a general classification was made by d'Orbigny, and the plan was undoubtedly very good; but it was badly worked out, and genera and species were manufactured wholesale, often on very insufficient grounds, and, on account of the great difficulty thus needlessly introduced by d'Orbigny, his system has received less attention than it deserves. The mode of growth was not made a family characteristic, but in the generic divisions he often indicated the manner in which a colony grew by an affix or suffix; thus he had *Flustra*, *Flustrella*, *Flustrellaria*, *Flustrina*, *Reptoflustra*, and nine other genera derived from *Flustra*; and on mastering one group we recognise the mode of growth from the name, as *Eschara*, *Reptescharella*, *Semieschara*; *Eschara* being erect, and consisting of two layers; *Reptescharella* adnate, and *Semieschara* consisting of only one layer. In most groups of animals such an arrangement would have little to recommend it; but in Bryozoa, whatever characters are taken for classification, forms with many common characters crop up in widely divergent genera; in fact, we may say the genera form an anastomosing network in any classification at present possible.

Johnstone employed a simple classification, which Busk somewhat modified when he wrote his Catalogue of the Polyzoa in the British Museum, and undertook the investigation of the Cray Polyzoa. In these the grouping is based principally upon the mode of growth; so that, for instance, a vast variety of forms with little in common, except the fact that they were incrustated on stones or seaweeds, were classed as *Leprulia*. We must not, however, forget

that, most unsatisfactory and unscientific as this classification is now seen to be, Busk's descriptions were extremely clear; and these have enabled specialists to use them as indices and become acquainted with their characters, and thus collect material for a more natural classification.

Some time after the publication of Busk's works, Smitt introduced a new classification, based mostly on the form of the zoecium, and using largely the shape of the oral aperture. This was applied to the northern Bryozoa, and also to those from Florida, and a new era was inaugurated; but the difficulties of the subject are so great, that in many cases the too rigid carrying out of his plan gives unsatisfactory results. But any classification must comprehend much of Smitt's, and we now have one modified by Mr. Hincks, or rather, we should say, we now see it carried out, and can better judge how it will work than we could from the preliminary notices which had already appeared in the 'Annals.' Of course most that is objectionable in the British Museum Catalogue is discarded, and the characters used are for the most part those employed by Smitt, the main difference being that Mr. Hincks makes much more use of the secondary aperture than had been done before; but in our opinion it seems probable that some modification may be required in some of the genera almost entirely based on the nature of the peristome; but should it be found in a few cases that this has only served as a means of cataloguing material, and is thus again a stepping-stone to further advances, it should not be forgotten that improved classification advances the science, and it may be many years before the addition of fresh material may render fresh changes necessary.

This is not the place for a critical examination of all the new or modified genera with which we have expressed general approval, but we must express regret that a genus which has been shifted about as much so *Cellularia*, and which might therefore be discarded altogether, has been retained (though in quite a different sense from that intended by Smitt, who employs it in a wider sense), and contains a large number of the genera included by Pallas (who created the genus), whereas, as Mr. Hincks points out, it does not, as now limited by Busk, include any of the forms placed by Pallas in the genus.

There are interesting chapters on the avicularia or "birds'-head processes"; on the reproduction and the affinities of the

Bryozoa; and on the name Polyzoa and Bryozoa, with which the writer of this notice does not agree, but as the reasons for dissent have been expressed elsewhere will not here introduce this question still *sub judice*.

After carefully examining with satisfaction a book written with so much care, and showing by the references that Mr. Hincks has not only a complete acquaintance with the English fauna, but also a large knowledge of the literature, it is with a feeling of disappointment that we find, before closing the volume, his "List of works on the Polyzoa" so unworthy of the rest; and it is difficult to understand on what principle it has been compiled, for important works mentioned in the text are omitted, and the references are incomplete. For instance, if we want Heller's paper on the Bryozoa of the Adriatic, we should imagine it was a separate work, and do not see that it appeared in the Proc. of the Zool. Bot. Verein of Vienna; nor would a beginner understand that when Ellis is referred to, that it is only his first book, and that the enlarged and more important work brought out in conjunction with Solander is not noticed. We refer to Hatschek's paper, and find only "Zeitschrift," which can hardly be considered sufficient, seeing there cannot be less than one hundred scientific journals called "Zeitschrift." Strange to say, this omission to particularize the Journal occurs many times. The reference to the papers of Milne-Edwards is incomplete, and those by Leidy and Dawson are referred to in the text, but not in the list. Again, if some of the works on tertiary fossils, as those of Reuss and Manzoni, are mentioned, we cannot see why the papers of Stoliczka and Gabb and Horn should not also have a place. Perhaps Mr. Hincks, knowing that several papers on the Australian and New Zealand Bryozoa have been written by authors almost wholly unacquainted with the group, thought it best to ignore them; but we do not agree in this, so long as they are quoted in the text, where, however, we should have been glad to know if Mr. Hincks had confirmed the authors' determination, since many are not to be relied on even for genera. On the whole, this book, with its excellent plates, does great credit both to the author and artist, as well as to the publisher, and we hope it will find the place it deserves in all zoological libraries.

THE ZOOLOGIST.

THIRD SERIES.

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[No. 44.]

DR. LAMB'S "ORNITHOLOGIA BERCHERIA."

IN an account of the Birds of Oxfordshire and its neighbourhood, by the Messrs. Matthews, printed in 'The Zoologist' for 1849, the authors refer to "an old MS. list of birds, collected by the late Dr. Lamb, of Newbury, extending as far back as the latter part of the last century," and which was lent for their perusal by Dr. Tomkins, of Abingdon (Zool. 1849, p. 2423).

This list, it would seem, was originally intended for publication in the 'Transactions of the Linnean Society,' and was forwarded for that purpose, about the year 1814, to Thomas Marsham, who was then Treasurer of that Society. For some reason, however, it never appeared, and the original MS., as we learn from the Assistant Secretary, was either lost or mislaid during the subsequent removal of the Society from the rooms formerly occupied in Soho Square. A copy, however, is in the possession of the Rev. W. Smith Tomkins, of Weston-super-Mare, who has kindly placed it at the disposal of the Editor for publication in 'The Zoologist.' Although the points of interest are not very great, the List is a curious one from the date at which it was prepared, while its value lies chiefly in the trustworthy records of species, now rare or uncommon, made by an observant resident in the county of Berks. It is here presented as the author left it, without any alteration, and with no other additions than those which appear editorially in the shape of foot-notes.

Dr. Lamb, it may be observed, was a friend and correspondent of Latham, who published some of his communications in the second Supplement to his 'Synopsis.'

ORNITHOLOGIA BERCHERIA.

Falco ossifragus.—Shot on Wantage Downs, Jan. 1793.

F. chrysaetus.—Shot at Shottisbrook, 1794.

**F. cyaneus* and **F. pygargus*.—Most assuredly male and female of the same species, having seen them, in June, 1790, hovering about the nest in an extensive furze-field, and when the young were fledged, a noted birdcatcher was employed, who, by lime-twigging the nest, caught both parents. The young were kept a long time in a garden, and proved Ringtails and Hen Harriers. Neither the male nor female is complete in plumage until the second year.

F. milvus.—Between thirty and forty years ago [*i. e.* between 1774 and 1784.—Ed.], very frequent about Reading, now very rare, having seen one only in May, 1795, near Reading, these twenty-seven years.

**F. subbuteo*.—Rare, only seen one specimen.

**F. buteo* and **F. tinnunculus*.—Very common.

**F. haliaetus*.—One shot near the Thames at Pangbourn, and one at Donnington, near Newbury, in January, 1810. *Pes sinister subpalmatus* an error of Linnæus.

**F. apivorus*.—Rare; a single specimen, female, shot near Reading, June, 1793; only larvæ in her stomach.

**F. aeruginosus*.—The most common hawk in the marshes about Newbury; very destructive to the young wild ducks. Rare about Reading.

**F. nisus*.—Rare; only two specimens seen.

**F. aesalon* (Lath. Ind. Orn., p. 49—119).—Shot near Reading, Jan. 25, 1794.

**Strix otus*.—Not uncommon.

S. flammea and *S. stridula*.—Very common.

S. ulula.—In the woods about Ticehurst.

S. brachyotus (Ind. Orn., p. 55).—Very common about Newbury. In Nov. 1795, I kept one alive for many weeks on mice and raw meat in a chicken coop. It was not fond of erecting its ear-feathers when looked at, but having an opportunity of viewing it through an aperture in the partition I could plainly discern that the crest, or ear, was composed of one single elongated feather. It was very tame, not offering to bite or strike with its

claws, only snapping its bill when I shewed it the food. The principal characteristic of the sex appears in the tips of the tail-feathers, which are white in the male and tawny in the female.†

**Lanius excubitor*.—Rare; a male shot on the banks of the Thames near Reading, Nov. 28, 1792. A female shot on the banks of an alder-stream near Aldermaston, Jan. 6, 1795, and a female shot near the Kennet at Newbury, Dec. 20, 1810; the leg and wing were broken, and when taken up by the fowler it darted its talons at him, and fixed them so close to his hands that it was with much difficulty extricated; immediately on which it bit its own injured wing in a most violent degree. In its stomach I found the bones and feathers of a small bird and some scales of fish.‡ From the above observations I should have been led to have placed them as winter visitants and living chiefly on fish; but the following case, which occurred within a mile of Newbury, 5 Aug. 1810, has entirely set aside that opinion:—A trap was baited with currants and cherries to catch small birds, which were very troublesome in the garden of George Goddard, Esq., Pyle Hill, and a young bird of this species was caught in it, and kept by Mr. Goddard till 16 Dec., who informs me that the same day he saw six more of them in his [left incomplete].

L. collurio.—Rare about Newbury; very common about Reading. Are partial to the former breeding-place.

Corvus corax.—Not very common; flying generally in pairs, and not very high.

C. frugilegus.—Common in every part.

C. cornix.—Not very often seen, unless on the downs. In one I dissected, Jan. 1794, I found many horse-beans in the stomach.

C. monedula, *C. glandarius*, and *C. pica*.—Very frequent.

Cuculus canorus.—Summer visitant; most assuredly heard March 19, 1811, near Hungerford (Lath. Syn., Supp. 2, vol. x. p. 134). The female has the same note as the male. In a female

† We should like to know whether this peculiarity has been remarked by other observers, and whether it is constant.—ED.

‡ The presence of fish-scales in the stomach is very curious. Indeed we do not remember to have met with any recorded instance of a Shrike taking fish. Not that such a feat is necessarily implied by the discovery of the fish-scales, any more than the presence of seeds in the crop of a hawk would imply that it was of granivorous habits. The Shrike may possibly have killed a young Kingfisher. But we are rather inclined to suspect that what were mistaken for fish-scales were most probably the elytra or wing-cases of some beetle.—ED.

I dissected I found two eggs, one in the ovarium, the other in the vagina. The egg is of a greyish white colour, with numerous dull red spots of various sizes. The stomach contained larvæ and small seeds.

Jynx torquilla.—Very common about Reading; rare about Newbury.

Picus viridis and *P. major*.—Less frequent than formerly.

P. medius.—Doubtless the young of *P. major*.

P. minor.—Common in orchards about Reading.

Sitta europæa.—Very common on lofty trees. The breast of the male sometimes roseate.

Alcedo ispida.—Common about our rivers. Lays nine eggs, as I found in July, 1790, whilst bathing.

Upupa epops.—Four met with near Reading and Wallingford in the spring of 1790, one of which was kept alive at a baker's at Reading, chiefly on the meal-worm.

Certhia familiaris.—Although common in trees about dwelling-houses I could never yet find the nest.

Anas.—*Cygnus fesus*.—Two shot near Reading, Jan. 1795.

A. tadorna.—Shot near Newbury, 1806.

A. fusca.—Two shot at Wargrave, Jan. 1795.

A. nigra.—A male and female shot, Oct. 1792, on the Thames near Reading. The male discovered by the protuberance on the bill, but neither labyrinth nor enlargement of the trachea. Its stomach contained only fluviatile vegetables. The gamekeeper who shot them informed me they dived so dexterously that he fired twenty shots before he killed them.

A. marila.—Shot Jan. 24, 1795, near Reading.

A. ægyptiaca.—One shot on the Kennet at Thatcham, near Newbury, Jan. 1795.

A. erythropus.—One shot at Swallowfield, near Reading, Jan. 24, 1795. I could not discover the flesh-coloured spot on the side of the bill (Latham), yet there was a small vestige of a spot. Perhaps a young bird or a female.

A. bernicla.—Frequently seen about Newbury in severe winters.

A. molissima [sic].—One shot at Sunning, near Reading, in a severe winter. Most delicious eating.

A. clangula.—Common in very severe winters upon our rivers.

Anas glaucion.—Shot at Reading, Jan. 1792.

**A. penelope*.—Oftentimes met with on the Kennet.

A. ferina.—About Jan. 1792, many shot about Reading; since that time rare, but in severe winters.

A. querquedula.—In the severe Jan. 1795, one specimen shot at Maidenhead.

A. crecca.—Yearly winter visitants in the marshes about Newbury.

A. boschas.—Breeds in abundance in the waters belonging to the Earl of Craven at Hampstead Marshall, with the Coots and Moorhens.

A. fuligula.—Shot, Reading, Feb. 1794, and at Newbury, Feb. 1809, but rare.

Mergus merganser.—Many shot near Reading in the winter, 1791; since that very rare. A solitary specimen shot at Thatcham, Dec. 1808; as food most unpleasantly fishy in taste.

M. serrator.—A male and female shot near Reading in the winter, 1795, and both equally fishy to the above.

M. albellus.—A male shot near Newbury, Jan. 31, 1814 [?]. It had a reflection of the trachea previous to the divarication.

Alca arctica.—Caught in Northbrook Street, Newbury, March 16, 1810; kept alive fifteen days on small fish. The edges of the bill were so particularly sharp as to cut the finger of the boy who caught it like a knife.

Alca alle.—In the early part of Nov. 1807, the male of this rare bird was shot in the mill-stream in the middle of Newbury; it had been seen swimming opposite the houses the most part of the day, diving frequently and visibly bringing up minnows (like a Dabchick), but so tame that the boys habitually were assailing him with stones. Its stomach, which was membranous, contained five minnows. I remarked that from this bird leaving Greenland we should have an early and severe winter, which proved correct.

**Pelicanus carbo*.—Shot in Fulsham Pound, near Newbury, Nov. 1803.

P. graculus.—Shot near Pangbourn, Sept. 1794.

Colymbus glacialis.—Three specimens met with; one at Pangbourn and one at Maidenhead, Jan. 1794, and one near Newbury, Jan. 1810.

C. immer.†—One shot at Maidenhead, Jan. 1794.

+ The young of the last named.—ED.

C. cristatus.—One shot near Hungerford, Feb. 1808.

C. auritus.—Frequent in all our rivers. Sometimes seen about Hamstead, making its nest of rushes floating on the water, and laying generally eight eggs of a [? dull or dirty] white.

C. urinator.^{*}—One shot at Sulhampstead and one at Sunning, Dec. 1795.

Podiceps rubricollis (Ind. Orn. ii. 783-6).—Shot at Burghfield, May, 1792.

Larus tridactylus.—In stormy springs occasionally shot.

L. canus.—Frequent about Newbury in the spring.

L. naevius.[†]—Two shot at Reading, March, 1794. One, winged, lived many weeks with ducks and fowls in a large yard in the strictest friendship.

L. ridibundus.—Often shot about the Kennet.

Sterna hirundo.—Sometimes seen about Reading.

S. minuta.—Shot at Wallingford, Sept. 1794.

S. fissipes.—Shot at Maiden Early, Sept. 1794.

Ardea cinerea.—Common in the marshes about Newbury. In a male I dissected, Dec. 1793, I found six small perch, weighing about 2 oz. each.

A. stellaris.—These birds, like the above, were about thirty years ago very common in the marshes between Newbury and Reading, but since the peat has been so much dug out they are become very rare. From repeated dissections I found the male alone had the loose membrane on the internal side of the trachea, joined by a strong ligament, which, passing into the lungs, authors conclude can be filled with air and exploded at pleasure, occasioning the bellowing noise, thereby controverting vulgar errors, particularly of our own poet, Thompson. In all of them which I have dissected I have found the female alone possessing the singular formation of the trachea, which after having passed into the thorax to the lower part of the sternum, was reflected to the superior portion of that bone, was again reflected, divided, and passed into the lungs. Some of the above observations were transmitted to my inestimable ornithological friend, Dr. Latham, F.L.S., and noticed by him in the second Supplement of his 'Synopsis.'

^{*} *Podiceps cristatus* in the winter plumage. It is singular that the author should have placed some of the Grebes in the genus *Colymbus*, but the Red-necked Grebe in the genus *Podiceps*.—ED.

[†] The Black-headed Gull in winter plumage.—ED.

Tantalus falcinellus.?—A male of this very rare bird was shot a few miles from Reading in Sept. 1793, while flying over Thames in company with another, and were supposed to be Bitterns. Having sent the description of the bird to our celebrated naturalist, Mr. Sowerby, F.L.S., who has favoured the world with it, accompanied with a coloured drawing, in his 'British Miscellany,' tab. xvii., p. 35, I must refer the Society to that work.

Scolopax arquata.—One shot at Pangbourn, Feb. 1795, and one at Newbury, Feb. 1811.

S. phæopus.—Shot at Sunning, Jan. 1794.

S. rusticola.—Visits Newbury in Oct. and returns in March. There cannot be a doubt but that there are two species in this country, having repeatedly seen them, the one nearly a third larger, with a huge ruff round the head, the colours darker, and the painter's feather at the tip of the wing much firmer.*

S. gallinago and *S. gallinula*.—Each breeds in the marshes about Wokingham. Supposed by many to be male and female of the same species, which I have not been able to contradict.†

S. glottis.—Shot at Sunning, Dec. 1801, and Newbury, Jan. 1811.

S. calidris.—Shot on the Loddon, Jan. 1799.

S. lapponica.—Shot near Reading, March, 1802.

Tringa vanellus.—Common about the heaths and fallows; breeding in the former.

T. lobata.‡—One shot in a pond at Shinfield, March, 1794.

T. ochropus.—Frequent on the banks of the Kennet.

T. hypoleucos.—Very common, and called the "Summer" and "Whistling" Snipe.

T. canutus.—Two shot near Reading, 1795.

T. cinclus.—In severe winters sometimes seen about Reading.

T. calidris.—Male and female shot near Oakingham, Feb. 1795.

Charadrius hiaticula.—Shot on Ilsley Downs, April, 1810.

C. morinellus.—Constant visitant on our downs; spring and autumn; very difficult to be shot.

* These differences are now generally regarded as dependent upon sex and age.—ED.

† It is to be regretted that no particulars are given of the alleged nesting of the Jack Snipe in the marshes about Wokingham. It is not impossible that a few pairs may remain in the British Islands to breed in suitable localities; but in most of the reported instances of their having done so, the details lack precision, and are quoted second-hand.—ED.

‡ The Grey Phalarope.—ED.

C. pluvialis.—Sometimes in flocks in the winter about the marshes near Reading, feeding on *Testaceæ*.

C. calidris.—Occasionally seen in the meadows near Newbury.

C. ædicnemus.—On the Wantage and Ilsley Downs frequently caught by the shepherd's dog, and kept in gardens. Its note is truly melodious, as its English name implies.

Recurvirostra avocetta.—Six of these beautiful birds were killed at one shot while swimming on a pond at Sunning, April, 1794. The stomach of the one which came under my inspection was muscular, and contained a few small stones and some short hairs; the heart was particularly large.

Hematopus ostralegus.—One shot at Burghfield in Jan. 1794.

Fulica atra.—Very common on the Kennet above Newbury. Breeds in the Earl of Craven's preserves.

F. chloropus.—Very common. The nest is most slovenly composed of a few dried oak-leaves and rushes, and contains generally eight eggs of a dull white colour, irregularly dashed with ferruginous spots.

Rallus crex.—Common in the summer and autumn. A female brought alive to me in July, 1793, laid an egg in my hand, which was about the size of that of the Quail, of a pale olive colour, marked with very large mulberry-coloured spots, like tortoise-shell.

R. aquaticus.—Common in our rivers, but very shy. In the stomach of a female, which was very muscular, I found only the remains of some *Testacea*.

R. porzana.—A female of this rare bird was shot at Kintbury, near Newbury, March, 1810.

Otis tarda.—Sometimes seen on Lamborn Downs (particularly March, 1802) before they were enclosed.

Phasianus colchicus.—A numerous preserve about Newbury.

P. torquatus (Gmel. Syst., ii., 742).—A most beautiful specimen shot at Burghfield, Oct. 1792. In his stomach I found eleven undigested acorns and some wheat.

Tetrao rufus.—One shot on Bude Common, Oct. 1794, and one in Newbury Manor, Sept. 1810, probably escaped from some aviary, as they are not known to breed here.*

* The scarcity of the Red-legged Partridge at this date in Berkshire is noteworthy, inasmuch as it had been introduced in Suffolk about 1770. See Stevenson's 'Birds of Norfolk,' vol. i.—ED.

T. perdix.—Abundant.

T. coturnix.—About thirty years ago very plentiful, now rare.

Columba ænas.—Common in our vale. In very severe winters I observe them hovering round chimneys.

C. palumbus.—Frequent in all our woods in the winter, feeding on beech-masts, young wheat, and turnip-leaves; building for many years.

C. turtur.—About autumn a troublesome visitant in the corn-fields.

Alda arvensis.—Very fond of perching in the spring.

A. pratensis.—Visits us early in April; leaves in June.

A. arborea.—Since the extravagant price of timber, rare.

A. trivialis.—Often heard and seen here, but difficult to shoot.

Sturnus vulgaris.—Common, and in vast flocks about the meadows; in the winter inhabiting dovecotes.

S. cinclus.—A male of this very rare bird flew into Newbury Mill in Oct. 1803.

Turdus viscivorus.—Very common; building early in the spring, having a nest in my garden March 8th, 1805 (a very severe season).

T. pilaris and *T. iliacus*.—Very plentiful in the meadows in the winter.

T. musicus.—Common in every part of the country.

T. roseus.—A male of this most beautiful and scarce bird was shot, Sept. 1810, while feeding amongst the cows in Newbury Common fields. His stomach contained some undigested coleopterous insects and a few stones. His head was much infested with *Pediculi*, which I sent to my much esteemed entomological friend, Thos. Marsham, Esq., F.L.S.

T. merula.—Very common.

T. torquatus.—Four specimens shot near Reading and Newbury.

Ampelis garrulus.—Occasionally met with in winter.

Loxia curvirostra.—About twenty years ago frequently met with in the spring, since which time have not been seen until July, 1810, when vast flocks visited us, particularly at Hungerford, destroying the *Aphides* on the young shoots of the cherry trees, a particular account of which I received from Mr. Hall, attorney, of that town, who, at my request, repeatedly observed them; and so intent were they on their food that he stood within

four yards of them, and adds, "The Crossbill places the side of its bill to the side of the leaf, and clears them out (though covered with insects) in a few seconds." I have frequently kept them in my aviary, where they were avariciously fond of the pine-cone.

L. coccothraustes.—This bird has been sometimes met with in this country. In Jan. 1810, a male flew through a pane of glass into a room at Mr. Perry's, Donnington,—a very tempestuous night, and I suppose was pursued by an Owl. I kept him on hemp-seed and the berries of the hawthorn about eighteen months.

L. pyrrhula.—Very common, and amongst gardeners supposed to be obnoxious by destroying the buds in the spring. A vulgar error!

L. chloris.—Very common.

Emberiza nivalis.—Two shot near Reading, Jan. 1795.

E. miliaria.—Very common from April to Oct.; rarely seen in the winter.

E. citrinella.—Frequent the whole year.

E. schœniclus.—Always in our marshes.

Fringilla cœlebs.—Male and female common with us the whole year.

F. montifringilla.—Vast flocks appeared in the severe winter, 1794, about Reading. Twenty-two were killed at one shot, and two wounded, which I kept in a large cage a long time with a Crossbill, Twite, Redpole, Siskin, and some Canaries, feeding on hemp and canary seeds. Six years previous I had not seen more than two. They are now very rare in this country.

F. carduelis.—Common.

F. spinus.—In the alder-groves frequent some years ago; now very rare.

F. cannabina and *F. linaria*.—Occasional visitants.

F. linota (Ind. Orn. i. 457—81).—I must here most widely differ in opinion with Mr. Montagu, who in his Orn. Dict. concludes with Linné this bird is nothing more than *F. cannabina*, varying only in age or sex. The *Linota* is the most common bird of the open fields in this county, breeding here, and remaining with us the whole year. They are caught in great abundance by the boys, and sold at a penny or twopence each. Some are marked with the red on the breast of both sexes, which are

thrown off at the first moultering, and then become the Brown Linnet; whilst the *Cannabina* is a rare visitant, appearing only in March and April with the *Spinus* and *Linaria*, and leaving us in August.*

F. domestica.—Very common.

F. montana.—Two instances of this bird having been met with in the county have come under my inspection, and from the season of their having been shot I have no doubt of their breeding here.

F. montium (Ind. Orn. i. 459-84).—A solitary specimen caught in the timber-wharf at Reading in March, 1794, and kept alive the whole summer with other birds in a large cage.

Muscicapa atricapilla.—A mutilated specimen of the male brought me in the spring of 1795.

M. grisola.—Common summer visitants, breeding here.

Motacilla lusciniæ.—More frequent about Reading than Newbury.

M. modularis.—Very common.

M. hippolais, *M. salicaria*, and *M. sylvia*.—Summer visitants, breeding here.

M. alba, *M. flava*, and *M. boarula*.—With us the whole year. The male of the *Flava* perches in the spring only. Often seen on the heaths in April and May.

M. ænanthe, *M. rubetra*, and *M. rubicollis*.—Breed on the commons about Reading, and remain with us the whole year.

M. atricapilla and *M. phœnicurus*.—Breed in my garden constantly, the males amusing me with their melody.

M. rubecula and *M. troglodytes*.—Very common all the year.

M. regulus.—This most elegant little bird breeds with us. In very mild mornings in January I have often observed them in my garden running about the gooseberry trees in search of insects, much resembling the manner of the *Parus cæruleus*.

M. trochilus.—Summer visitant.

Sylvia sylvicola (Linn. Trans. vol. ii. p. 245, tab. 24; vol. iv. p. 35, tab. 2, egg).—This bird, described by me in the 2nd vol. of our 'Transactions,' and its history more fully explained by Mr. Montagu in the 4th vol. of the same work, to which I refer the reader, is become much more common with us than formerly.

* The *Cannabina* of Dr. Lambe was most probably the Mealy Redpoll.—Ed.

Parus major and *P. cæruleus*.—Very common throughout the year. The latter is particularly fond of the unripe seeds of the *Papaver album*, picking holes in the capsule for that purpose.

P. ater, *palustris*, and *caudatus*.—More rare than formerly, but each species breed here. The latter congregate in autumn in flocks of between forty and fifty in a tree.

P. biarmicus.—Frequent on the banks of the Kennet between Reading and Newbury, feeding on the small *Testaceæ*. They undoubtedly breed about Newbury, but I have never been able to discover the nest.

Hirundo rustica and *H. urbica*.—Always appear earlier with us in very stormy springs.

H. riparia.—Breeds in the sand-banks, Reading; much more rare about Newbury.

H. apus.—In the spring of 1794 I observed them on the 22nd of April, the most early I ever knew. These birds are invariably troubled with *hippoboscæ*. I caught them in my garden in the summer of 1807 in the act of fighting. Their claws were so firmly locked with each other that I was under the necessity of calling assistance to extricate them, which was done with the greatest difficulty.

Caprimulgus europæus.—Very frequent about Reading and Newbury. The eggs of this bird, which are only two in the nest, have been badly described by authors, excepting Mr. Montagu, Orn. Dict. The one painted by Lewin in the Portlandian Collection, a faithful copy of which is now before me, is a most base representation. Having frequent opportunities of seeing the eggs, we found them invariably obovate, an inch and a half in length, a white ground irregularly but beautifully variegated with light and dark brown, interspersed with occasional streaks of light blue. In those I have dissected I have chiefly found in the stomach large night moths.

To Thos. Marsham, Esq.

My dear friend,

I have copied the enclosed from my ornithological *vade mecum*, which I request the favour of you to peruse and correct its errors, and then to lay it before one of the Meetings of the Lin. Soc.; and if, after the perusal, the committee should consider it proper for publication in our Transactions, I shall

feel myself most highly obliged by a dozen of the copies of it as struck off from the press. Accept, my dear Sir, the warmest thanks of a grateful heart for every mark of your kindness, and particularly of your introduction of me to this learned body, of which I will exert myself to prove deserving your kindness. Ah, Sir, little did I think, even when I was elected an associate, to have seen this Society so flourish!

I hope Mrs. Marsham and your family are well. Happy should I be to see you here. I am building a pretty cottage, which will be shortly finished, when I hope to enjoy the *otium* (dare I say *cum dignitate*), but where I should be proud next summer to see you. My kindest respects to Mrs. M., self, and family (particularly our friend Gibb).

Believe me, dear Sir, yours, &c.,

T. L.

When you see our worthy *præses*, pray present my kind respects to him.

Newbury, 23 Aug. 1814 [?].

ORNITHOLOGICAL NOTES FROM NORFOLK FOR 1878.*

BY HENRY STEVENSON, F.L.S.

EXCEPTIONAL seasons demand exceptional treatment, and as it is not always possible within a limited period to obtain all the information required, I must ask permission to follow up my "Notes" of last year with a summary of such facts as have since come to my knowledge through many reliable correspondents, or have been picked up in friendly conversation, relative to the combined effects of flood and frost upon resident and migratory birds alike, in the first half of the winter of 1878-79. It will be remembered that the disastrous floods which in November, 1878, reached their greatest height on the 19th and 20th of that month, and not only in and around this city, but almost throughout the county, laid the low-lying lands and marshes under water, were succeeded about the third week in December by frosts of unusual severity. The wide extent of country still submerged became one sheet of ice, and not only the larger broads, but parts even of

* Supplementary to those published in 'The Zoologist' for 1879, p 153.

the navigable rivers were "laid" across, and afforded excellent skating.

The shore-gunners had now the best of it, for whether flooded or frozen out, the feathered denizens of the broads and surrounding marshes had pretty well disappeared, excepting the Ducks, which in large numbers sat huddled up upon the ice in the daytime, far out of gun-shot, though at "flight" time exposed to a sharp fusillade as they sought their nocturnal feeding grounds. Coots had gone to the salt marshes, Waterhens dispersed over the uplands to turn up, here and there, in the most unlikely localities, while those too enfeebled by cold, or otherwise too crippled to leave their accustomed haunts, fell victims to the Hooded Crows. The Snipe also sought inland springs, or, if not leaving us altogether, tarried awhile on the coast; and so also the Woodcocks, which, if sparsely sprinkled about inland, were in some localities plentiful enough by the sea. The few decoys still worked, and especially those on Fritton Broad, near Yarmouth, fared well throughout the season; and neither the severe weather before Christmas, nor even the noisy onslaught of marsh gunners thinning their ranks nightly, when the decoy "rose," seemed to drive the Ducks from their quiet retreat by day; though the open water in the "pipes," and the cunning of the decoy-man and his confederates—the trained dog and decoy ducks—lured many to destruction.

I am indebted to my friend Mr. Bellin, of Yarmouth, for the following return of wildfowl received by one, only, of the game-dealers in that town, between the 14th and 28th of December, which, in variety and numbers, takes one back almost to old times, when, as recorded by Messrs. Paget, in their "Sketch of the Natural History of Yarmouth," Isaac Harvey, who then received the bulk of the birds killed in that neighbourhood, had brought to him on one market day, in the winter of 1829, "no less than four hundred wildfowl of different descriptions, five hundred Snipes, and a hundred and fifty Golden Plover."

Wildfowl, Waders, &c., received from Dec. 14th to Dec. 21st, 1878.

Full Snipe	-	-	-	-	447
Jack Snipe	-	-	-	-	21
Green and Golden Plover	-	-	-	-	206
Grey Plover	-	-	-	-	3

Woodcocks	-	-	-	-	14
Waterhens	-	-	-	-	41
Rails	-	-	-	-	2
Water Rails	-	-	-	-	17
Coots	-	-	-	-	43
Stints	-	-	-	-	133
Owls	-	-	-	-	13
Hawks (various)	-	-	-	-	4
Grebes	-	-	-	-	9
Curlews	-	-	-	-	2
Hérons	-	-	-	-	4
Kingfishers	-	-	-	-	3
Teal	-	-	-	-	35
Golden-eyes and other fowl	-	-	-	-	147
Duck and Mallard (220 from Fritton Decoy)	-	-	-	-	421
Great Plover *	-	-	-	-	1
Eared Grebe	-	-	-	-	1
Rough-legged Buzzards	-	-	-	-	2
Smews (male and female)	-	-	-	-	2
Sundries	-	-	-	-	29
					—1600

From Dec. 21st to Dec. 28th.

Full Snipe	-	-	-	-	207
Jack Snipe	-	-	-	-	6
Woodcocks	-	-	-	-	11
Green and Golden Plover	-	-	-	-	100
Waterhens	-	-	-	-	57
Coots	-	-	-	-	17
Water Rails	-	-	-	-	14
Landrail*	-	-	-	-	1
Stints	-	-	-	-	360
Owls	-	-	-	-	7
Grebes	-	-	-	-	13
Hérons	-	-	-	-	7
Teal	-	-	-	-	37
Golden-eyes, &c.	-	-	-	-	73
Duck and Mallard (87 from Fritton Decoy)	-	-	-	-	197
					—1107
					—
					2707

* The occurrence of these birds in Norfolk *in December* is noteworthy.—ED.

With reference to some of the entries in the above lists, Mr. Bellin kindly procured me the following particulars:—

The twenty-two Grebes, with the exception of two or three Dabchicks, and the one Eared Grebe? were, I regret to say, of the Great Crested species. The Eared (probably Slavonian) was purchased by a gentleman who took it to Cambridge. The Golden-eyes were almost all Tufted Ducks, a common name for that species in Norfolk. Of the true Golden-eye, *Fuligula clangula*, Mr. Bellin informs me he saw but one or two specimens all the winter. As Duck and Mallard, as well as Teal, are separately mentioned, the rest of the fowl consisted, no doubt, of Wigeon, with a few Pochards, rarely, from their diving habits taken in decoys, all of which, in Norfolk, come under the denomination of “half fowl.”

The small number of Jack Snipes as compared with Full Snipes is noticeable in both lists, but at the earlier period they would seem to have been most abundant. One Landrail is specially mentioned, and the two Rails entered separately in the list from December 14th to the 21st, were probably Spotted Rails or Crakes, and the much smaller number of Coots and Waterhens would indicate that the former, as is usual in sharp weather, had left the Broads for more southern quarters, or the salt marshes north of Yarmouth.

The Owls, like the Hawks, may be described as “various,” none rare, but including Barn, Tawny, Long-eared, and perhaps Short-eared. As to this, however, I cannot speak positively.

The small number of Curlews in such a season is remarkable, as also the absence of what gunners term “hard-weather fowl,” such as Goosanders, Mergansers, Velvet Scoters, Scaups, Golden-eyes (*clangula*), &c., of which Mr. Bellin informed he saw scarcely any. The number of Woodcocks killed at that time on the Yarmouth coast, is in no way represented by the five-and-twenty in the lists, as numbers were shot by amateur gunners, which never came into the dealers' hands. About the same time Mr. Cremer, of Beeston, near Cromer, in four afternoons, shot over forty Woodcocks, which he found close to his house, flying from place to place, and apparently seeking food. Many of these may have quitted the inland plantations, but in some instances they were seen to come from the seaward. He also shot at the same time a good many Green and Golden Plover. He heard of a flock

of about thirty Swans that passed close to his house, but no Ducks or Geese in that locality.

Of the great immigration of Redwings and Fieldfares between the 18th and 21st of December, 1878, referred to in my last year's "Notes," I have received particulars from various correspondents.

Mr. Bellin remarks the extraordinary number of Redwings, Fieldfares, and Missel Thrushes that in the first frost passed southward along the Yarmouth coast, the flight lasting for days. Mr. Cremer gives the same account at Beeston, where, as inland, the Redwings largely predominated; they passed in a constant stream from east to west, the largest flights in the evening. He shot a great many by standing under the fences in their line of flight, as they kept coming all day in the same direction. At Sheringham, near Beeston, Mr. H. M. Upcher says, many of these birds "were picked up dead, day by day, under an *Arbutus* shrub, as many as seven in one morning; the birds, no doubt, having crept under for warmth"; but, from an absence of wind at the time, these birds, though sadly pinched for food, did not suffer as I have known them to do in some winters. At Feltwell, on the other side of the county, Mr. Upcher adds: "Birds of this kind seemed to leave with the beginning of the frost, and the few that remained probably died of cold or starvation."

Sky Larks were, at that time, so plentiful in the "Fen," that from twenty to thirty dozen were taken daily in "hingles." He saw some wild Geese when shooting at Didlington, but heard of none about Blakeney at that time, and but few Ducks, except at night. In the south-western part of the county, on the river at Buckenham, and in the vicinity of the adjacent meres, there was excellent Duck-shooting whilst the frost lasted, but from the number bred yearly on the Merton and Wretham Estates, including Teal, Shovellers, Gadwalls, and even Pochards, these may not have been largely increased by foreign arrivals. Again, from the north and west of the county, Mr. Anthony Hamond wrote on the 19th of December, that at Westacre "springs" he had had good sport with wildfowl, including Mallard, Gadwall, Shovellers, Widgeon, and Teal, and he understood there were large numbers in his district. One man, about the 10th or 12th of December, shot twenty-three couples of Snipe at Hunstanton.

Mr. Hamond also heard of several Waxwings having been seen in his neighbourhood, but I have not been able to ascertain that any were shot.

From inland localities on the east side of the county I have notes from Mr. F. Norgate, of Sparham, and Mr. Purdy, of Aylsham, who seem to agree that, although the birds generally suffered much from the severity of the weather, there were but few deaths from actual starvation. Mr. Norgate believes that, owing to the number of hedge-shooters at the time, most of the birds found dead had been previously wounded. A few Green Woodpeckers and Robins were picked up dead in his neighbourhood, no doubt victims of cold and privation. Kingfishers, as stated in my last year's "Notes," suffered so severely in the November floods that scarcely any were left to succumb to the frost.

At the height of the November flood in the Wensum Valley, Mr. Norgate found the fences, rough grass, and drifted rubbish near the streams alive with Water Voles, Field Voles, and Shrews; and Sparham Heath swarmed with mice, as our City wharfs and warehouses did with rats. Wildfowl were abundant in his neighbourhood during the frost, and Waterhens were all over the place. The Partridges do not seem to have suffered, owing probably, as Mr. Purdy suggests, to the fences being comparatively open, not blocked with drift snow, and an absence of wind with the frost.

Amongst the more important specimens recorded in 'The Zoologist' for 1880 (p. 49) by Mr. T. E. Gunn, birdstuffer, of Norwich, as having passed through his hands in 1878 (not included in my previous "Notes"), are a Lesser Spotted Woodpecker, shot at Raveningham, Norfolk; another seen with it at the time. A female Little Bustard, shot at Caister, near Yarmouth, on the 12th of September; two or three specimens of the Kentish Plover from Breydon, in October, and a Temminck's Stint on August 24th; an adult male Night Heron, killed at Mundham, near Harleston, on the 10th of May; and a female Gull-billed Tern, shot on Breydon, on the 8th of May; and at the same time, another Tern of the same species, which unfortunately was not preserved.

My journal for 1879, during something more than the first half of the year, seems less like a record of ornithological

occurrences than a meteorological register, and that of the most dismal kind. With the exception only of a few mild days in February and March, frost and snow, more or less severe and deep, continued into May (snow falling heavily in some parts of the county on the 1st); and a cold, cheerless June, varied only by severe thunderstorms and drenching rain, was followed by such a downpour in July as caused floods throughout the county scarcely less extensive and disastrous than those of November, 1878. In a season, therefore, in which the winter overlapped the spring and an autumnal summer was succeeded by a more summer-like autumn, it is scarcely to be wondered at that our resident and migratory birds alike should have suffered from weather of so abnormal a character, or that the sportsman and naturalist should have had as poor a time of it as the agriculturist and the gardener.

The severe frosts in January only exceeded those of the preceding month in duration, and the addition at times of a keen searching wind, which reduced most of our resident birds, Thrushes, Starlings, Blackbirds, &c., to a wretched state of tameness through privation. But though more deaths, I believe, occurred from such causes after than before Christmas, the remarks made in my supplementary notes for 1878, as to the effect of the cold and scarcity of food upon the birds generally, are as applicable to the commencement of 1879 as to the close of the previous year. The shore-gunners had but a small chance of rarities, as the "hard-weather" fowl had passed south with the earlier frosts and with the broads and rivers frozen over for weeks together, and even portions of the navigable rivers "laid" across, the marsh-gunners had even less sport. Snipe, Coots, and Waterhens had dispersed long before; even the Black-headed Buntings had left the reed-beds for the fields and stackyards, and the Bearded Tits probably left us for a time, for I neither saw nor heard of any. Bird-life in such localities, in fact, was represented by the Hooded Crow, everywhere searching for "cripples"; and by immense flocks of wild Ducks,* which frequented the frozen waters and reed-beds by day, quite inaccessible to the sportsman till the evening "flight," though the very few decoys still existing

* An old marshman at Surlingham told me he had never seen such large "lumps" of fowl, as on one or two evenings, during the January frosts, left the broad for their feeding grounds on the Brundall and Strumpshaw side of the Yare.

were worked successfully. Wild Geese were seen in considerable numbers on the coast and in the open parts of the county during the prolonged frosts in January. On the 17th a "skein" of forty-two, species unknown, were observed at Northrepps. Brants were plentiful at Yarmouth and Lynn, and in the Cley and Holkham marshes, and the lands adjoining. Pink-footed Geese were said to be "as common as Rooks." Enormous flocks of Dunlins frequented the Breydon "muds" when the weather was most severe; but little else of note, except the usual congregation of large and smaller Gulls, some of which in favourable localities were so hard up for food that the fisher-boys trapped them alive on the shore.

The great flight of Redwings and Fieldfares, the chief feature of the December frosts, had passed southwards,—the survivors at least,—and scarcely any were seen later; but the remains of many were found when the snow disappeared in the marshes surrounding the broads, and in other wild and out-of-the-way places, where they had sought in vain for a sufficiency of berries and other food.

Bramblings, which early in the winter had been very scarce, appeared in considerable numbers at Yarmouth, and in some more inland localities, in the January frosts, with Snow Buntings in plenty; but I heard of no Mealy Redpolls, or Siskins. Hawfinches and Green Woodpeckers, as will be seen by the following notes, suffered considerably; but the Kingfishers that survived the November floods, on the eastern side of the county, must have left us for a time, as none, that I am aware of, were found dead during the frosts.

Such was the winter! and the so-called spring, repudiating altogether Thompson's poetic notions, but closely assimilating itself to Tom Hood's version of that rheumatic season, brought us more snow, varied with rain or sleet, severe frosts at times, and cold nights, continuously till the birds of our gardens and shrubberies seemed as thankful for the supplementary food supplied to them as in the "hard times" of the winter itself. Such, too, was the fate that awaited our summer migrants, whose insectivorous appetites it was impossible to provide for artificially. As a rule, I have no reason to think that our summer visitants arrived much later than usual, the Nightingales certainly did not; but in such weather as we experienced in March and April, it becomes a farce to register first appearances, as these unfortunate

victims of our fickle climate no sooner reach our shores than the keen winds by day and frosts at night compel them to seek the thickest shelter in our woods and plantations that a backward vegetation can afford; and many days may have elapsed from the time of their arrival before some sunny morning tempts them into song, and betrays their presence amongst us. Mr. T. W. Cremer, of Beeston-by-the-sea, writing on the 23rd of April, speaks of the warblers just over as in a wretched plight from the cold; some Redstarts seen a few days before looked as if they must die, and many, no doubt, of various species did succumb.

At Palgrave, near Diss, Mr. Ringer informs me that several Nightingales were picked up dead, and the same thing occurred at the Ipswich Arboretum. Swallows and House Martins suffered severely from the effects of cold nights and the paucity of insect food, and many, no doubt, died in exposed parts of the county. Even after nesting had commenced, the Martins in some localities were observed to forsake their nests, if built with a northerly aspect. Though plentiful near the coast the small number of Swallows and House Martins breeding in our inland towns and villages was quite a matter of comment, and that, even, in the vicinity of our broads, where insect food might most be looked for. They were very late before they left the rivers and marshy grounds to seek their usual nesting-places, and it was not till the last week in May that I observed them in the streets of this city and its suburbs. The Sand Martins, more sheltered in their nest holes, seemed, by the numbers I saw in autumn to have been more favoured, though hard put to it for food on their first arrival. The Swifts arriving later escaped such privations, and were unusually noisy throughout the summer. On the 30th of August I counted twenty-eight chasing one another in the evening round the steeple of Cromer church.

Young Rooks suffered, with other arboreal species, from cold and "short commons," and the number found dead under the trees in many places was traceable to gales at the time. With most of our Finches and Warblers, I believe, the first broods were either not reared at all or but a small proportion survived, and certainly one of the most marked and depressing features of bird life in the summer of 1879 was the absence of song.

If such was the fate, however, of the birds of the uplands, what of the denizens of the broads and marsh-lands?—ground-

nesting species, subject to the rising waters in spring, when the snow and ice began, at last, to change to sleet and rain; and to the far more serious floods in July—when all later nests were washed away, or rendered, for all practical purposes, about as valueless as the surrounding hay-crop. Taking Surlingham Broad as an example of most similar localities I can say that, though visiting it both in summer and autumn, and in all cases in exceptionally fine weather, I never saw so few birds of any kind, and the silence of the “marsh nightingales” was something painful. Even the harsh note of the Black-headed Bunting was rarely heard. Reed Warblers had not appeared in their usual numbers, and many were supposed to have died from the cold. Sedge birds, more plentiful, had both early and late nests destroyed, and their notes amongst the reeds in July were few and far between. Very few young birds were seen in September. Coots and Waterhens seemed almost exterminated, and the cry of either species was an event in the day. Even the chief test of numbers on such waters—the hour of sunset—showed how terribly the winter and summer, alike, had told upon them. Snipe, Redshanks, Lapwings, and Wild Ducks, shared the same fate, and when the “ronds” and marshes were mown in the autumn the remains of many young birds were found. I heard, also, on good authority, that on the Merton Estate, on the other side of the county, where various species of wildfowl nest yearly in a wild state, as many as sixty or seventy young ones were picked up dead on the margins of the meres in that neighbourhood, presumably from a want of sufficient insect food.

Even the Corporation and other tame Swans, on the Yare, though, in ordinary seasons, able to challenge all other competitors as to the number of young reared, felt the effect of such a season, and the “fall” of cygnets was far below the average. How they subsisted in the severe and prolonged frosts it is difficult to imagine, as the swan-herd told me that some pairs on the broads, could not be got at from the ice; but their constant paddling in the large “dykes” usually keeps an open “wake,” which for the sake of the submerged weeds is always an attraction to fowl. The privations of the winter, therefore, and the cold backward spring, no doubt delayed their nesting operations, and then the height of the waters drove several pairs from their accustomed haunts, that were long in settling elsewhere. The rest of the story, as told to

me, is one of disaster—addled eggs, young drowned or trampled on by the cock birds in asserting a right to some particular spot; and thus, when I visited Surlingham just before the “upping” in August, I found instead of nine, ten, and eleven cygnets, as usual, with each pair, six or seven were high numbers; and more than one old pair had taken to the river without a single contribution to St. Helen’s Swanpit.

Partridges, of course, suffered with other ground-nesting birds, and numbers of young were found dead. So bad a season has not been known for years, and it might have been well if, by common consent throughout the county, as was the case in many localities, partridge shooting had been postponed for a twelvemonth.

In such a year late nesting, not only amongst the *Hirundines*, often late breeders, but with most birds, became the fashion, and nestlings—whether they survived or not, I cannot say—were seen exceptionally late. For example, a Yellowhammer’s nest, with eggs, was found on the 9th of October, and a young Waterhen, about half grown, was seen on the 25th of November; but whether nestling Barn Owls at Ryburgh and Sparham, early in November, may be reckoned amongst the exceptional features of the year I am not prepared to say. If, however, our summer migrants failed to divert us with their song in spring and summer, the *amende*, in some slight degree, was made in our more genial autumn months. As late as the 15th of July the Cuckoo was heard singing his perfect note. Chiffchaffs and Willow Wrens in the last week of August were singing in my garden, as in April and May,—not the young male, practising his notes for next year, but the adult bird, in full song,—and late into September, Swallows were “garrulous” on the wing. It seemed almost as if the melody of spring, frozen up at that time in their little throats, had like the tunes in Munchausen’s horn thawed at last—and better late than never.

Here then, from the close of one winter to the commencement of the next I close my narrative, trusting I may long be spared such a threnody over the fauna of this county as has been called forth by my reminiscences of 1879.

JANUARY.

Shoveller.—Notwithstanding the severity of the frost at the time, there was a male Shoveller in our fish-market about the

middle of the month, and I heard of one or two others having been killed. These no doubt were all bred in the county.

Black-headed Bunting.—A male brought to me alive on the 14th, caught wild a few days before, had already attained very nearly the black head of the summer plumage, and thrives well in my aviary. The severity of the winter, both before and after Christmas, seemed to have had little effect upon its constitution.

Hawfinch.—As usual these birds fell victims to the gunners during the frost, the general want of food drawing them from their hiding-places in yew and fir trees, and abating even their peculiar shyness. Of some dozen specimens that I saw during the month, all came from localities in this county, where they are known to, or are most likely to, breed; and I have no reason to suppose that they are otherwise than residents.

Woodpecker.—Amongst a dozen or more of Green Woodpeckers received during the first half of the month by only one of the Norwich birdstuffers, I saw but one Great Spotted, shot at Winterton, near Yarmouth. From the experience of other severe winters I believe the Green Woodpeckers, like the Hawfinches, thus sacrificed, are all residents, exposed alike to the privations of such seasons, and, from their gay plumage, to the observations of a more than usual number of gunners; and such a prize is sure to find its way to the birdstuffers.

Grey-lag Goose.—A bird of this species, said to have come from the neighbourhood of Lynn, was brought to Norwich in the flesh on the 14th.

Lesser Spotted Woodpecker.—An adult female was shot at Clippesby on the 23rd.

Bewick's Swan.—Mr. F. W. Tracy informs me that, on the 17th of February, he shot one of a pair of Bewick Swans which had frequented some marshes on the Norfolk side of the Waveney, between Shipmeadow and Ellingham, for several days.

Bittern.—A fine specimen, killed near Yarmouth, was sent up to Norwich on the 23rd.

Magpie.—A single bird was seen at Northrepps on the 22nd, five near Sherringham on the 23rd, amongst a flock of rooks in a field, and two at Northrepps on the 27th. Two or three pairs were seen in the neighbourhood of Holt early in June, which indicated their still nesting in that part of Norfolk.

Pintail Ducks and other Wildfowl.—Amongst the very few wild Ducks in mature plumage observed at this time may be mentioned a pair of Pintail Ducks from Yarmouth, sent to Norwich on the 20th, and two adult males on the 27th, and another on the 30th. About the same date a beautiful adult male Sheldrake was killed at Holkham.

Great Northern Divers, &c.—A good many Divers, but chiefly in immature plumage, are said to have appeared off the Yarmouth coast during the hard weather. A young Great Northern Diver was exhibited in Norwich fish-market on the 16th, and another was shot at Blakeney on the 26th.

Black-headed Gull.—I was not aware till last winter that the young of this species are found with the nearly complete black head of the summer plumage in December and January. Mr. F. Norgate, on the 26th of December, 1878, picked up a young bird with black head, barred tail, and mottled wing-coverts, and on the 28th saw others with black heads.

FEBRUARY.

Bernicle Goose.—A specimen of this somewhat rare Goose, even in severe winters, was killed out of a flock of five at St. Faith's, near Norwich, on the 7th; and I heard of one seen at a game-dealer's shop in Yarmouth about the same time.

Bewick's Swan.—A fully adult male was shot on Breydon on the 10th. The feathers on the upper part of the head were slightly stained with rust-colour.

Slavonian Grebe.—Mr. J. H. Gurney, jun., has recorded, in the 'Zoologist' for 1880 (p. 181), the occurrence, on the 17th, of one of these Grebes at Sidestrand, near Cromer, which was stoned as it swam about in a horse-pond close to the public road, and not more than a quarter of a mile from the sea.

MARCH.

Great Crested Grebe.—A fine bird, just returned to its summer haunts, was shot on Rockland Broad, and sent to Norwich on the 8th. Such was all the protection afforded by certain new Acts of Parliament, it being *no one's business* to prosecute gunners, collectors, or dealers.

Water Rail.—A bird of this species was found dead under the telegraph wires near Northrepps, and, singularly enough, near the

place where a Spotted Crake met its death in like manner about a year ago.

APRIL.

Woodcocks remaining to breed.—Mr. T. W. Cremer, of Beeston, near Cromer, informs me that about the second week in April an unusual number of Woodcocks were seen in his neighbourhood; his keeper, when looking for Pheasants' nests, usually flushing eight to ten couples in a day. I have not heard whether any nests were found in that neighbourhood (though a single bird was seen about July 1st), but one was found at Hempstead, near Holt; and a nestling was taken close by, at Kelling, in May. Woodcocks were seen at Northrepps on the 28th and 29th of March, the 8th and 26th of April, and the 8th of May.

Hoopoe.—Mr. Cremer also informs me that he saw, about the second week in April, a Hoopoe flying across his pond at Beeston; the bird was coming towards him, but turned off suddenly on seeing him, and he feels no doubt as to the species.

MAY.

Puffin.—About the second week in this month I saw several of these birds which had been sent to our Norwich birdstuffers, which, though forwarded from somewhat inland localities, had most probably been obtained on the coast. They were for the most part in very poor condition, though rich in the colouring of the bill; and, in the absence of gales or hard weather, their emaciation was probably due to some disease, as is the case sometimes with Razorbills and Guillemots.

*Departure of Migrants, as observed in the vicinity of Norwich and Cromer.**—January 3rd. Thousands of Larks flying from S.W. to N.E., observed most of the day at Long Stratton, and by another observer about four miles from thence, as recorded in 'The Field.' March 4th. A few Hooded Crows seen going away on the coast near Northrepps, and more on the 10th. Again, on the 19th, very large flocks of these birds were seen departing from the same point of the coast. These birds remained very late on the coast about Holkham and Wells, and destroyed large numbers of Lapwings' and Ducks' eggs. March 21. A flock of Fieldfares seen at Northrepps going north-east. March 28th. A

* For the reason given in my introductory remarks, I have omitted the dates, or supposed dates, of arrivals of migrants.

very large flock of Lapwings, flying high towards the west, was seen from Cromer station.

AUGUST.

Great Crested Grebe.—On the 13th, on Wroxham Broad, I saw a pair of these birds diving for small fish, with which they fed their young ones, about three parts grown. At another part of the Broad was a single bird whose mate was said to have been shot, and this one, towards evening, suddenly rose from the water and flew over to the Hoveton side of the river; its long neck stretched out giving it much the appearance of a miniature Diver. It is very unusual to see this species on the wing, except on their first return to our broads and meres in spring.

Pochard at Surlingham.—On the 6th of this month I saw a hen Pochard on "Bargate," which allowed a pretty near approach before it rose and flew into a reed-bed. A cock Pochard, winged, had been seen on the same water late in spring, and this hen bird had probably joined him; but if they had a nest it must have been destroyed in the summer floods.

Lesser Spotted Woodpecker.—I heard of one having been killed early in the month at Saxlingham. The bird was said to be chasing a Nuthatch, and both were shot.

Green-backed Porphyrio.—Mr. J. H. Gurney, jun., recorded in 'The Zoologist' for 1879 (p. 458), the occurrence of another bird of this species (*Porphyrio smaragdonotus*), at Barton, on the 23rd of August. This makes the fourth example killed in this county; but one of these, shot at Hickling, was no doubt an escaped bird.

OCTOBER.

Shore Larks.—Three specimens were sent to Norwich for preservation on the 16th, which had been shot at Yarmouth.

Long-tailed Duck.—An immature bird was shot at Yarmouth on the 20th.

Little Gull.—Mr. J. H. Gurney, jun., received a single specimen from Yarmouth about the same date as the preceding.

Ring Ouzel.—Mr. T. E. Gunn, in 'Land and Water,' records a Ring Ouzel as seen in a garden in Norwich about the end of October.

Black Guillemot.—When at Yarmouth this month Mr. J. H. Gurney, jun., ascertained that a specimen of this Guillemot, rare

on the Norfolk coast, had been killed at Yarmouth last winter, but whether in 1878 or 1879 I am not aware.

Black Redstart.—Mr. Gurney also informs me that on the 30th of October he had a near view of a male Black Redstart, which had for some days frequented the garden and terrace adjoining Mr. H. E. Buxton's residence at Fritton, near Yarmouth.

Skuas, Fulmars, &c.—A description of the extraordinary influx of Pomatorhine Skuas, and smaller species in much less numbers, will be found elsewhere.* In the course of the month two Fulmar Petrels, in immature plumage, were also picked up alive but exhausted at Weybourne, and I heard of one or two Gannets about the same date.

NOVEMBER.

Cormorant.—A young bird of this species was captured alive on the beach at Sidestrand early this month.

Shore Larks.—Four were shot at Blakeney on the 6th, and two at Yarmouth about the same date.

Red-throated Diver.—A specimen killed on the 6th, though in change, had much red colour still remaining on the throat. Another was shot off Cromer later in the month.

Grey Phalarope.—A single bird was seen swimming in the sea off Wolferton early in the month.

Fulmar Petrel.—Two more Fulmars, both in immature plumage, were killed, one at Holkham on the 7th, and one at Yarmouth on the 20th. The first was quite emaciated, the latter just as fat.

DECEMBER.

Glaucous Gull.—A beautifully-marked young bird of this species was shot on the coast in the first week of December, and two were observed off Cromer early in November.

Little Auk.—One picked up alive at Blakeney on the 6th.

Eider Duck.—An immature female shot at Salthouse in the first week of December.

Smews.—Two adult females were shot on Breydon on the 8th, and two more about the 28th.

Lesser Spotted Woodpecker.—Another example of this small Woodpecker was shot from the upper branches of a tall oak on the 16th.

Bittern.—One shot at Barton on the 5th.

* Trans. Norfolk and Norwich Nat. Soc.

Pied Wagtail, variety.—An unusual variety of this bird, having white feathers on the neck and wing-coverts, was shown me on the 6th.

Shore Larks.—Mr. J. H. Gurney, jun., shot four at Blakeney on the 12th, and saw others. No longer a rarity on our coast.

Migratory Waders.—On the 17th of March a Golden Plover, in nearly full breeding-dress, was killed at Fundenhall. On the 14th of April a Green Sandpiper was shot at Keswick. Three Kentish Plovers, a male and two females, were shot on Breydon between the 23rd and 26th of April. I heard also of two Spoonbills being seen on Breydon early in the summer, one of which was said to have been shot and sent to Norwich. There were but few Godwits at Yarmouth in May, and little else worth notice. A Green Sandpiper was observed in the neighbourhood of Holt on the 5th of June; and on the 6th three Spoonbills were seen near the lifeboat house at Blakeney, feeding by the water's edge; and the fact is worthy of record that, although discovered and watched for some time through a glass by two local birdstuffers, the birds remained unmolested, and the recent Act respected. At Yarmouth the inducements held out to the gunners to secure all rarities would have insured their destruction. The man who breaks the law gets the best of it at present. On the 20th of June, at Hunstanton, I saw, as the tide began to fall, a considerable flock of Turnstones, apparently in nearly full summer plumage, busily feeding on the first portions of rock exposed above water. On the sands also were two birds which I believe to have been Knots, and several Oystercatchers by the water's edge, but no Sanderlings or Dunlins. A single Turnstone was also seen on the edge of a sand-bank in Wells Harbour on the 21st. On the 19th of August Mr. J. H. Gurney, jun., received from Hasborough eleven red Knots and a Redshank, shot near the lighthouse. They were all old birds in about three parts summer plumage, and, strange to say, the reddest proved to be a female. On the 12th of August three Greenshanks, birds of the year, and two immature Temminck's Stints were sent up from Yarmouth. On the 30th of August, a hot sunny day, when walking over the lighthouse hills, I heard the far distant note of the Redshank, and, with some difficulty, traced it to a flock of birds so high up in the clouds they looked "scarce so gross" as Finches, but with a good glass I made them out to be what I suspected by the note. They

were circling round and round, and apparently uncertain what direction to take, but at last they passed on inland towards Felbrigg and Beeston, and at the same altitude. I had just previously heard, though faintly, the cry of the Great Black-backed Gull, and almost as high up as the Redshanks. I made out a small group of these birds, who were having a mazy dance up in the blue sky, flying in wide circles over the sea, though not far from the shore, and were revelling in the warmth of an almost unknown sunshine in the summer of 1879. On the 23rd of September a few Greenshanks, Turnstones, Pigmy Curlew, Grey Plover, Knots, and Dunlins were seen at Blakeney, and some shot. The Knots were extremely poor in condition, as were others killed a week before; the rest were in good condition. A Grey Plover, shot at Yarmouth on the 21st of September, retained very nearly the full black breast of its summer plumage. A Little Stint was also shot at Blakeney on the 30th. A very considerable flight of Snipes appeared in the marshes between Surlingham and Rockland about the middle of September. A marshman, who was looking after his cygnets, told me he put up over a hundred Snipe in one afternoon, and I believe the same was observed at Ranworth. On the 7th of November a Purple Sandpiper was shot at Yarmouth, and one at Blakeney on the 29th; and on the 5th a Sanderling in nearly full winter plumage at Yarmouth. Immense flocks of Dunlins on Breydon, and a few Knots during the severe frost early in December, but little else of note amongst the waders.

Raptorial Migrants.—On the 10th of February a Rough-legged Buzzard was seen at Northrepps flying inland, and a Common Buzzard appeared in the same locality on the 5th of March. On the 16th of March a young male Kite, a rare species now in Norfolk, was trapped at Northrepps after frequenting the neighbourhood for some three weeks. The bird was in good condition, though in rather worn plumage, and was altogether somewhat light-coloured. A female Hobby was shot at Sparham on the 3rd of April; and on the 8th of June a Short-eared Owl was seen at Northrepps, a most unusual date, unless the bird had remained to breed somewhere in the county. Mr. J. H. Gurney, jun., has also recorded in 'The Zoologist' for 1879 (p. 490) an "extraordinary assemblage" of this species on the Beacon Hills, near Cromer, on the 6th of November, when from the open

heath and brakes, and from clumps of young Scotch firs, forty or fifty were flushed in one afternoon. About this date a fine adult Merlin was seen at Beeston, near Cromer; and Mr. J. H. Gurney informed me of an apparent immigration of Barn Owls on the same part of the coast. On the 7th a small Owl, species not identified, was seen in the Cottage Wood at Northrepps, and on the 12th four Short-eared Owls were flushed on Roughton Heath. A fine young female Sea Eagle, of course announced in the local and other papers as a Golden Eagle, was shot near the Heath House at Holt on the 13th; an adult Peregrine at Brandon on the 18th, a young female on the 29th at Holkham, and two others in the county early in the month.

A GERMAN VIEW OF THE FAUNA OF IRELAND.

BY ERNST FRIEDEL.

(Continued from p. 296.)

Amphibia and Reptilia, which may be obtained for stocking aquaria and closed cases at all large markets, are here unrepresented; and I never met with a more universal detestation of such creatures than in Ireland. It is a generally accepted statement that there are positively no snakes, toads, or frogs in the Sainted Isle, and that when any evil-disposed person has attempted to introduce them they have died almost immediately.

I gave my best attention to the creeping things here, and quote the following from Thompson's 'Natural History of Ireland':—

"The Loggerhead Turtle, *Chelonia caretta* (Linn.), has been caught on the coast of Donegal, as well as near Youghal, and a *Testudo*, supposed to be a Snapping Turtle, was kept for some months in a pond at Fort William, near Belfast. In the 'Northern Whig' of July 12th, 1849, appeared a notice of a 'fine young turtle, caught in the channel at Cork.' Evidently both creatures had been brought there, probably in American vessels.* *Testudo europæa* is absent from England as from Ireland. *Zootoca*

* Not necessarily so. *C. caretta* is very common in the Mediterranean, and only of occasional occurrence in the Atlantic.—ED.

vivipara, Schreiber (*Herpetologia Europæa*, 1875, s. 429), is common in Ireland, and much feared by the people as poisonous, although without any reason. According to Ray, *Lacerta viridis*, Daudin, is also found, but, as suggested by Bell (Brit. Rept.), this is probably only a green variety of *Lacerta agilis*. The O'Flaherties bear a lizard on their coat of arms, the life of one of their ancestors having been saved by a lizard which ran over his face and neck, and waked him from sleep at the approach of his enemies. From snakes, the slow-worm included, Ireland seems indeed to be altogether free."

In the 'Edinburgh New Philosophical Journal' for April, 1835 (vol. xviii. p. 373), it is remarked, "We have learned from good authority that a recent importation of snakes has been made into Ireland, and that at present they are multiplying rapidly within a few miles of the tomb of S. Patrick." On this Thompson observes:—"I never heard of this circumstance until it was published, and subsequently endeavoured to ascertain its truth by inquiring of the people about Downpatrick (where the tomb of S. Patrick is), who are best acquainted with these subjects, not one of whom had ever heard of snakes being in the neighbourhood. Recollecting that about the year 1831 a snake (*Natrix torquata*), immediately after being killed at Milecross, was brought by some country people, in great consternation, to my friend Dr. J. L. Drummond, I thought this might be one of those alluded to, and recently made inquiry of James Cleland, Esq., of Rathgael House, Co. Down, twenty-five miles distant in a direct line from Downpatrick, respecting snakes said to have been turned out by him. I was favoured by that gentleman with the following satisfactory reply:—"The report of my having introduced snakes into this country is correct. Being curious to ascertain whether the climate of Ireland was destructive to that class of reptiles, about six years ago I purchased half a dozen of them in Covent Garden Market, in London. They had been taken some time, and were quite tame and familiar. I turned them out in my garden. They immediately rambled away; one of them was killed at Milecross, three miles distant, in about a week after its liberation, and three others were shortly afterwards killed within that distance of the place where they were turned out."

Rewards for the capture of adders were offered, apparently by

the clergy, in order that St. Patrick might not be deprived of the credit he enjoyed as banisher of snakes. Mr. Davis, writing from Clonmel, Tipperary, in February, 1846, informed Thompson that the Ringed Snake, "had been several times introduced, but seldom, if ever, survived the first winter." Some hundreds were said to have been liberated in a demesne near Clonmel a few years before, but not one was to be met with within twelve months after.

Of Newts, *Triton cristatus* is seldom seen.* *Triton teniatus* is common near Dublin. Schreiber considers this to be the species referred to by Thompson (p. 68) as *Lissotriton palmipes*, Bell, on account of its high crest, plain tail, and the large spots on its back and belly. There is also a third *Triton*, at least, in Ireland, which Thompson identifies with *Lissotriton punctatus*, Bell. The specimens described by him (p. 68) remind me most of *Triton Blasii* of Bretagne, though the latter is very rare; it is not unlike *T. cristatus*, and almost as warty. Nor is Ireland yet exhausted, for *T. helveticus*, Razoumowsky, and *T. vittatus*, Jenyns, might be noticed. The genus *Salamandra* is unrepresented.

The Edible Frog is not found, but *Rana temporaria*, Linn., may be seen in various places. I myself observed a dozen fine specimens in the damp garden of the Lake Hotel at Killarney, in the month of June. This frog, however, does not seem to be of very common occurrence in Ireland, for I met with many country people who absolutely denied, in the name of St. Patrick, that frogs were to be found in Ireland at all. In Stuart's 'History of Armagh' the following passage occurs:—"The first frog that was ever seen in this country made its appearance on pasture-land near Waterford about the year 1630, and is noticed by Colgan in a work printed in 1647." It is stated in Rutt's 'Natural History of Dublin' (vol. i. p. 290), that the frog was brought to Ireland in 1699, by Dr. Guithers. Guithers was a Fellow of Trinity College, Dublin, and is said to have procured frog-spawn from England, and placed it in a ditch in the University Park. Others give 1696 as the date of introduction. A gentleman in the County Antrim writes:—"My grandmother, who was born 8th January, 1726, used to tell me that when a girl at school she was taken some distance to see a frog, which was exhibited as a curiosity. Her father lived at Ballycorr, Antrim, so this applies to the North of Ireland."

* It was unknown to Thompson.—Ed.

Even Thompson has deemed it worth while to note in his journal every locality where he saw or heard a frog.

The Tree Frog and the Common Toad are entirely absent from Ireland; but the Natterjack, *Bufo calamita*, Schinz, is found in some parts of Co. Kerry, and is said to be indigenous, although, according to an old account, numbers of them were turned loose from a ship at Dingle Bay. In 1836 Dr. Ball placed sixty Natterjacks in the Zoological Gardens, Phoenix Park, but not one was ever seen again. Strange to say, this creature seems to be dwindling away in many places, as, for instance, in Brandenburg. *Bombinator igneus* is found neither in England nor Ireland.

Let us now see how tradition and ancient learning account for the absence from this country of so many characteristic reptiles. As early as 840, St. Donatus, Bishop of Etruria, writes of Erin:—

“Ursorum rabies nulla est ibi; sæva leonum
Semina nec unquam Scotica terra* tulit:
Nulla venena nocent, nec serpens serpit in herba,
Nec conquesta canit garrula rana lacu.”

Küttner (‘Briefe über Irland,’ 1785, p. 117) remarks:—
“Poisonous creatures, such as scorpions, snakes, toads, &c., are not found anywhere on the island. They have been brought there in various ways, but not one has ever lived. No one is able to tell me the real cause of this remarkable phenomenon. Nor were there any frogs in Ireland. They were first taken there in the reign of William III. Even now there are but few, and they utter no sound, as on the Continent.”

Julius Rodenberg (‘Die Insel der Heiligen,’ Berlin, 1860, vol. i. p. 322), referring to the passage just quoted, observes:—
“This is almost precisely what was written by Ricardus Corinensis, or, as the English call this chronicler, Richard of Cirencester: ‘No creeping thing is found there (in Ireland), nor any vipers or snakes. Snakes, which were often taken thither from England, died so soon as they neared the coast. Almost everything on the island is an antidote to poison, &c.’ (Giles, ‘Six Old English Chronicles,’ London, 1848, p. 458.)

Worthy Jacobus Waræus (born 1594, died 1666), in his treatise, ‘De Hibernia et Antiquitatibus ejus Disquisitionis’ (2nd

* In the Middle Ages the term “Scotia” was often used to signify Ireland.

ed., Lond. 1658, p. 73), remarks:—"Sed inter vere miranda non omittendum, Hiberniam non gignere venenatum quicquam nec alere aliunde invectum, habere tamen araneas et lacertas, sed eas non venenatus."

St. Patrick, the Apostle of the Irish (born in Scotland in 372), is said to have found the island teeming with snakes, and to have banished them all at his word. They were all driven into Lough Napeastia (Lough-na-Peiste), or Snake Lake, in the district of Glendalough. Since then the lake has been shunned, and no one ventures to bathe

" In that lake, whose gloomy shore
Sky Lark never warbles o'er."

A particularly large snake used often to crawl out of the water and entreat St. Patrick to allow him a little freedom. The Saint appointed a place for him; but one of the celebrated "seven churches" being begun soon after, within the area allotted to the snake, the latter made itself very objectionable by knocking down the masonry every night. It was banished into the depths, but still does harm under the name of "Irish crocodile." For Roderic O'Flaherty, in his 'Description of West or H'Iar Connaught,' 1684 (edited by Hardiman, Dublin, 1846, p. 19), relates the following of Lough Orbsen, now generally called Lough Corrib, and celebrated for its eels and salmon-trout:—"On the south side of the lake are medicinal leeches. There is also a strange creature, which we will call the Irish crocodile; and about ten years ago a certain man, who is still living, had a very unpleasant adventure with this animal. The man was walking along the shore, and saw in the distance the head of some beast. He took it for an Otter, and thought no more about it; but the beast raised its head and looked at the man, dived under and swam till in shallow water, then suddenly rushed out and seized him by the elbow till he stooped down, when it fixed its teeth in his head and dragged him away towards the lake. Fortunately the man got hold of a stone that was lying there, and remembering he had a knife in his pocket, drew it out and stabbed the beast, so that it let go its hold and disappeared in the lake. The water round him was red with blood, though whether from himself or the monster, or both, he could not tell. He described the animal to be the size of a greyhound, with black sliny skin and no hair.

Old inhabitants who know the lake well affirm that it contains just such a beast, and that a strong country lad with his wolf-hound once came across it. After a long struggle it escaped; but later, when the lake went down, it was found decaying in a rocky hole. The like is also seen in other lakes in Ireland; it is called *Dobanchu*, *Anchu*, or Water-dog."

Thus does the whiskey-heated imagination of the Irishman embellish his country's fauna. According to another version it was St. Kevin, with his wolf-hound, who quieted the serpent of Lough-na-Peiste.

* * * * *

Crofton Croker (p. 328) describes the lake-serpent, the *Payshtha*, as a great lake-eel, seven ells in length, and as large round as the body of a bull, with a mane on his neck like a horse. An animal of this description, a sort of dragon, is represented on Irish metal and in wood-work of the Middle Ages, initials of manuscripts, &c.*

It is somewhat remarkable that those nations, which, like the Irish, have no snakes,—or, like the Scandinavians, only a single small and rarely-occurring poisonous species,—should think so much of the serpent; far more, in proportion, than those which have a superabundance of these reptiles. The reason may be, to quote Tacitus, in the mystery of ignorance—in the excitable imagination which loves to depict horrors in the strongest, most wonderful form. An explanation may also be found in mythology, and the superstitions which have sprung from it. Celts and Germans imported serpent-worship from Asia. The "*Payshtha*," the treasure-keeper of the Irish, is no other than the "*Fafnir*" of the North Germans, or the treasure-guarding dragon of the South of Germany; just as the "sea-serpent" which appears periodically in the North of Europe is no other than the old Norse "*Midgard's* serpent."

The legend of the banishment of reptiles by St. Patrick is symbolical of the expulsion from heathendom of the devil, "that old serpent," by Christianity. The lay of St. Kevin typifies the extinction of the last signs of heathendom. Subsequently the

* See the specimen given in Wakeman's '*Handbook of Irish Antiquities*' (Dublin, 1858); Worsaae, '*Norkiske Oldsager*' (Copenhagen, 2nd ed. 1859, figs. 417, 505 and 508); Montelius, '*Antiquités Suédoises*' (Stockholm, 1873, figs. 424, 511, 543, 649 and 651).

Archangel Michael is proclaimed to all Europe as the dragon-slayer; the dragon killed by him being the symbol of the heresy which he had to conquer. Similarly in the Gothic architecture and sculpture of the age of romance we find dragons, serpents, and frog-like monsters introduced as serviceable to Christendom. There are in Germany many similar legends to those of the Irish with regard to snakes. When a bell is being founded, a snake is often thrown into the molten metal, that all snakes may fly far from the sound of that bell. At Bernau, near Berlin, one of these bells was broken; all the snakes came back, but were obliged to retreat once more when, in 1649, the bell was recast. It is said that when Luther was translating the Bible at Wittenburg the frogs in the moat round the convent disturbed him incessantly. He cursed them, and since that time they have never been heard there. A similar story is told of the pious monks of two famous convents, Lehnin and Chorin, in Brandenburg.

The true reason for the dearth of reptiles in Ireland lies in its position as an island. There are many instances of islands whose fauna is strikingly defective as compared with adjoining continents. The island of Sylt has no snakes or rats. The peninsula of Wittow, part of the island of Rügen, has neither *Vipera berus*, *Tropidionotus natrix*, nor *Lacerta viridis*, nor yet the Mole, an animal which is also unknown in Ireland. In the 12th century, when Bishop Absalom of Ronskilde was besieging Arcona, Wittow, "insula archonensis," was separated from Rügen by an arm of the sea. Since that time they have been reunited by sand-hills, which contain terrible quicksands. Although Wittow is thus again connected with the mainland, centuries have not sufficed to induce the above-mentioned creatures to cross over from the latter; the desert region of the quicksands has cut them off as effectually as did the sea itself. A year ago "The Schabe" was made a roadway planted with trees and underwood, which is eminently adapted to facilitate a crossing. It will be interesting to ascertain whether or not the fauna of Wittow will gain in consequence. Nevertheless naturalisation is more difficult than appears at first sight. *Tropidionotus natrix*, which is common on the west coast of Schleswig, has repeatedly been introduced at Keitum, in Sylt, only a few miles from the coast, but up to this time apparently without success.

According to our present knowledge, the reptiles of Great Britain and Ireland may be classified as follows:—

BATRACHIA.

1. Triton tæniatus.*
2. „ helveticus.
3. „ vittatus.
4. „ cristatus.*
5. Rana esculenta.
6. „ temporaria.*
7. Bufo vulgaris.
8. „ calamita.*

REPTILIA.

1. Pelias berus.
 2. Tropidonotus natrix.
 3. Coronella austriaca.
 4. Anguis fragilis.
 5. Lacerta vivipara.*
 6. „ agilis.*?
- (The fresh-water *Testudinata*
are not included.)

Those marked * occur in Ireland. To go still further, and compare Scandinavia; it has 11 *Batrachia* and 6 *Reptilia*; Denmark has 8 and 6; the Netherlands and Belgium, 12 and 7; France, 21 and 27; Germany and Austria (exclusive of the Southern Tyrol), 15 and 13. Thus the large island of England is far behind other countries of Europe in regard to its reptilian fauna, even behind Scandinavia, while the smaller and more remote island of Ireland is behind England and Scotland. Even should certain species be added at some later period, this will hardly effect the conclusion that the separation of England from the Continent, and of Ireland from England, took place before any of the recent *Amphibia* and *Reptilia* of the mainland had been established in Great Britain, or those of Great Britain had extended into Ireland.

II. THE INTERIOR OF THE COUNTRY.

Judging by superficial descriptions, one would suppose that Ireland, zoologically speaking, possessed no interest for the travelling naturalist. The London correspondent of a Hamburg journal writes:—"It has always been much to be regretted that Ireland offers such slight attractions to the ordinary traveller. Although this island is the subject of continual public discussion, I believe it is one of the least known parts of Europe, in spite of its relation to England and the English."

* * * * * *

It cannot be denied that the aspect of the country is in many respects very depressing; order and cleanliness, such characteristic features of English and Scottish life, are in Ireland altogether wanting. Agriculture is in a miserable condition, the

chief hindrance to its progress being the excessive moisture of the ground. You find everywhere standing water, ponds, bogs, moors, and fields damp and overgrown with rushes and reeds. I saw one estate which had, at great expense, been twice drained, two feet deep the first time, three feet and a half the second. In spite of this the sedges flourished as before, and the turf was damp and spongy. To make such ground really dry, the drain-pipes ought to be at least four feet and a half deep; but, as a great part of Ireland lies little above the level of the sea, it would in many cases be difficult, where not impossible, to obtain sufficient fall for effectual drainage. An enormous expenditure of both capital and labour would be required thoroughly to drain the country; large canals would have to be made throughout the land, and the work would be far beyond the powers of either owners or occupiers. In the parts of Ireland that I visited the cultivation of wheat is impracticable; coarse hay and oats only are produced. Consequently the fodder and manure are of poor quality. The want of good land for cultivation causes the absence of good game, and thus there is no temptation offered to well-to-do people in search of sport. Partridges can hardly be said to exist at all;* Pheasants are only found with great difficulty; and should any sportsman desire to shoot Snipe and Wild Duck in the bogs, he must verily be willing to lead an amphibious life. This absence of game gives to country life on one side the Channel a totally different aspect from that on the other; a circumstance which contributes largely to the want of intercourse—so general and so much to be regretted—between the landed aristocracy and the people.

* * * * *

Ireland being almost entirely unexplored by English naturalists, its Zoology and Botany may well be made a field of research by German naturalists. How much may be learned in a short stay is shown by Dr. Arnold von Lasault's work, 'Sketches and Studies in the Mineralogy and Geology of Ireland, made in August and September, 1876,' published at Bonn, 1878.

But to return to the indigenous animals. With the ancient Kerry Cow may be classed the old Irish Deer-hound, also fast dying out. * * * * * These hounds were valued by the Irish chieftains to defend their lake-dwellings (*crannoges*) against Danes and English. Of presents given by the King of

* See Thompson, Nat. Hist. Irel., vol. ii. p. 58.

Connaught are mentioned amongst others:—"To the King of I-maine, seven dresses, seven coats, seven horses, seven greyhounds. To the King of Luigne, ten horses, ten dresses, ten goblets, and ten greyounds. To the Prince of Cineal-n-Aodah, seven slaves, seven women, seven goblets, seven swords, and seven greyhounds."

The conscientious chronicler O'Flaherty writes:—"In the western ocean, beyond Imay, are three little islands called Cruagh-ar-ni-may, called by Sir James Ware (Ant. Hib. cap. xxviii. p. 287) "*Insula cuniculorum*," on account of the number of rabbits found there. These islands are fatal to dogs, which die almost immediately on landing." The islands are now called Crua Islands; they are untenanted except by rabbits, but no particular fatality amongst dogs is observable there at the present time.

We will now speak of the Wolf-hounds, and at the same time of their enemies the Wolves. In the 'Present State of Great Britain and Ireland' (1738), it is said, "There are too many Wolves in Ireland; the people are obliged to institute wolf-hunts, lest they should be devoured by them." To this may be added a remark of Kohl's:—"One of the last Wolves in Ireland (some say the last) is said to have been shot in the year 1712, in one of the glens on the east coast."*

A proclamation [of Oliver Cromwell], dated from Kilkenny, the 27th April, 1652, forbade the exportation of Wolf-hounds† from Ireland, in consequence of the great increase of Wolves there about that date, and the destruction of cattle by them. * * * * In 1653, and even in 1665, large rewards were offered for the capture of Wolves. O'Flaherty thinks that these "wolfe dogges" were of a different kind from the "*Canes venaticos quos grehoundi vocamus*," mentioned by Camden (p. 727). These Greyhounds, which have smooth skins, are depicted by Waraeus on the title-page of his 'Hibernia,' 1658. Dr. Smith, in his 'Ancient and Modern State of the Co. of Kerry,' remarks that certain ancient

* Compare W. Boyd Dawkins, 'Cave Hunting,' p. 76. The remark of Kohl, quoted above, does not quite agree with his observation (part i. p. 284) regarding the neighbourhood of Killarney, "The last Irish wolf is said to have been shot in Macgillieuddy's Reeks about the year 1700."

† The author has "wolfskins" (wolfshäuten), but this is a mistake. The Order in Council referred to is given by Hardiman in his edition of O'Flaherty's 'West or H'Iar Connaught,' p. 180. See also an article on the Extinct British Wolf in 'Popular Science Review,' 1878, p. 400.—Ed.

enclosures were made chiefly for the protection of cattle against Wolves, and that the latter were not entirely extirpated in Ireland until about the year 1710.

Oppian, in his 'Cynegeticon,' describes the Scotch terrier, but not the Irish wolf-hound. Symachus (about A.D. 500) refers to seven Irish dogs which were sent in iron cages to Rome, where their strength and fierceness excited great admiration.

From a paper in the 'Linnean Transactions' (vol. iii.) by A. Burke Lambert, in which he describes and figures a dog in the possession of Lord Altamont [son of the Marquis of Sligo], it appears that the Irish wolf-hound had wide pendant ears, hanging lips, a hollow back, thick body, smooth hide, &c. Judging from this description it certainly differs from the Irish greyhound, which seems to have become entirely extinct.*

Of the domestic cat I may repeat what I have remarked regarding the cats of Italy, France, England, and certain parts of South Germany, in contrast to North Germany—it is respected equally by men and dogs.

Whether the Wild Cat (*Felis catus*) occurs in Ireland, as in Scotland, is at present matter for conjecture. Cats which have run wild are occasionally caught, and resemble the male Wild Cat in many respects, but not in all.†

(To be continued.)

ORNITHOLOGICAL NOTES FROM YORKSHIRE.

BY WILLIAM EAGLE CLARKE.

THE unusually severe weather that characterised the latter days of 1878 and the first two months of 1879 was most disastrous to many forms of bird life. Thrushes, Blackbirds, and Redwings, more especially the latter, perished in great numbers; this was particularly evident at Spurn Point,—that narrow neck of sand and bents which forms the south-eastern limit of our county,—to which great numbers of these species resort, being attracted by the *Helicidæ* abounding there. This state of things was duly taken advantage of by the villainous Grey Crows, which were frequently observed in pursuit of the starved Thrushes, which, of

* It is now generally admitted that the dog described by Lambert, here referred to, was not an Irish Wolf-hound at all, but a "Great Dane."—ED.

† Several so-called "Wild Cats" in Ireland proved to be Martens.—ED.

course, fell easy victims to their persecutors ; as a consequence, the Crows shot at this season were in the highest possible condition. The few Woodcocks that remained in this same district were so reduced as to allow themselves to be picked up. The Starlings also suffered greatly. At Marston, in the Vale of York, is a small fir-plantation, which in the autumn and winter is the nightly resort of thousands of these birds, which about sunset begin to arrive from every direction, and form one or more immense flocks. After indulging for a short time in preliminary flights, they settle down in the trees, when their united chatter for the next quarter of an hour, heard from a short distance, bears a striking resemblance to the roar of a distant waterfall. Amongst this colony the severe cold made sad havoc, such immense numbers succumbing that, when the spring advanced, the effluvium from their decaying bodies caused the plantation to be simply unbearable. At Wilstrop my friend, Mr. Harrison, found a Kingfisher frozen to death on the iron frame of a sluice ; the feet being fixed, and the body leaning forward with outstretched wings, as if in the act of taking flight.

During the early part of January Water Rails were exceedingly abundant in South-East Yorkshire ; being, no doubt, immigrants from the Continent, from whence this species arrives annually in the autumn. One of these birds came on board a fishing-smack when some miles off the coast, and was kept alive for about a week by its captor.

The first fortnight in February found hundreds of Guillemots and Razorbills lying dead along the shore at Easington—victims to the continued severity of the season.

The first spring migrant I observed was a Chiffchaff on the 23rd March. This was followed by the Willow Warbler on the 1st April ; the Sand Martin on the 5th ; the Wood Wren on the 9th. The Ring Ouzel I saw on the Beamsly Moors on the 12th ; and a Common Sandpiper was observed in Holderness on the 14th.

On the 30th March I saw a larger number of Pied Wagtails together than had ever been my lot ; I counted 130, and there were many more. They were feeding on a lawn in Wharfedale, and were probably, if not certainly, a flock on their migratory course from more southern winter quarters. When at Bolton Abbey, on the 12th April, I had the pleasure of watching for some

time the actions of a fine male White Wagtail, as it ran nimbly on the stony bed of the River Wharfe.

An extraordinary migration of Common Scoters occurred at Skipton, in West Yorkshire, on the night of the 24th April. My friend Mr. Hewetson happened to be in the locality the day after the occurrence, and kindly gave me the following notes, which he collected from various witnesses. Shortly after dark, the wind blowing gently from the east, cold and fine, but very dark; numerous birds were heard passing overhead. The rushing of their wings was very loud, and, together with a loud whistling pipe, completed the aerial confusion. The flocks passed over most of the night, during which time the ducks, evidently bewildered by the lights of the town, flew against chimney-pots and houses. Some were found in the rooms of a large mill; others, after flying about the streets, settled exhausted, and were captured alive. The greatest number, however, were taken in the vicinity of the railway-station, where the lights were especially numerous. Here they immolated themselves against the telegraph wires; and the largest share of ducks fell in the morning to the railway servants. One porter picked up seventeen, and several others five or six each. A considerable number were taken, out of the canal which passes through the town. In all, after careful enquiry, I calculated that about 150 had been taken, the majority of which were males. I obtained a male alive and quite uninjured; also a Kittiwake, the tip of whose wing had been broken by flying against a chimney-pot. I learnt also that a few birds uttering the calls had passed over on the 25th; I was anxious to hear if any would pass on the following night, the 26th. Accordingly I went into the garden of the friend with whom I was staying at about eight o'clock. It was then drizzling; the wind N.E. and very slight; the sky dull and heavy. I had not been out long before I heard the cries of the birds on the west, the note being the same as on the night when the ducks were caught. For two hours at least the birds were passing, uttering a double flute-like pipe, which I hesitated to identify. This difficulty I cleared up most satisfactorily afterwards, for on letting out my male Scoter for a run on the lawn, when trying to rise the bird uttered this note. I noticed that as the birds approached the town over the moors they uttered very few call-notes, but when flying over the town the notes were uttered repeatedly, as if the

lights bewildered them, and they continued calling until their notes died away in the distance. The captured Scoter frequently repeated the note described, which, when uttered in alarm, is very like that of a newly-hatched chicken in distress, but more flute-like.

At Spurn, on the 31st May, I found eggs of the Lesser Tern. A colony of these elegant little birds resort to the sands here annually for breeding purposes, but in diminishing numbers, for they are sadly persecuted by idlers from the opposite Lincolnshire coast and by the few inhabitants at this "land's end," who collect their eggs for domestic use. An interesting find here on the 2nd June was a Ring Dotterel's nest containing *five* eggs, all the laying of one bird, for, besides possessing in common a strong family likeness, they were of an uncommon variety both as regards ground colour and markings. This is another species whose eggs afford food for the natives.

During my visits to Spurn in June, I was much surprised to see about a score Turnstones in full summer plumage. These birds being still there on the 16th, I requested a person who lives in the district, and who is well up in the local birds, to inform me if they remained throughout the summer. The result of his observations was that he saw them almost daily up to the time of the arrival of the first autumnal immigration of this species, which occurred on the 28th July. As the species does not breed there, these were either old barren birds or last year's birds not breeding. I also noted a pair of Whimbrel and numerous Dunlin on the Humber muds during the first week in June.

Mr. Thomas Bunker, of Goole, informs me that there is little doubt that the Short-eared Owl bred on the Goole moors, for a pair were observed there all through the summer, and some men employed in draining were swooped at by the old birds. On the 21st June Mr. Harrison put up a Short-eared Owl at his feet in a rough grass field at Wilstrop.

In the third week of July a nest of the Quail containing eggs was found at Boston Spa by mowers. One was picked up dead in the cutting of a new line of railway at Sandsend, near Whitby, about the same time.

Swifts were unusually numerous on the coast during August. They left Spurn to a bird on the 28th of that month. A perfectly white Swallow was frequently observed at Wilstrop, and was

generally mobbed by its normal brethren. A pair of Swallows at Easington produced three clutches of eggs. The first was removed, owing to the site chosen for the nest being inconvenient. The others produced young, the last of which left their nest on the 3rd October.

The first immigrants among the shore birds were the Turnstone and the Dunlin, which arrived on the 28th July. Knots in immature plumage were observed on the 18th August. At Spurn, on the 4th September, I noted Redshanks and Whimbrel on the muds, and a single Sanderling on the shore. A solitary Bar-tailed Godwit was killed with a stone in a field at Easington late in September, and was the only specimen observed in the district during the season. Bar-tails in other seasons are not uncommon there during the autumn and winter. An immature Little Gull was shot at Spurn on the 16th September, whilst in the company of numerous Common and Arctic Terns. A beautiful pair of Curlew Sandpipers were obtained at Kilnsea on the 20th, and are now in the collection of Mr. P. W. Lawton, of Easington.

The Yorkshire coast came in for its share of the now historical visit of the Skuas, of which much has been already written. Mr. Alfred Roberts, of Scarborough, communicated to me some very interesting notes, which I think will be read with interest by ornithologists. Speaking of Buffon's Skua, he informed me that five males and three females were brought to him for preservation, chiefly in mature plumage. These were as a rule obtained singly on the coast, but several were observed to frequent that part of Scarborough Bay where the main sewer discharges its contents. Here, in company with a few examples of the Pomatorhine species, they kept a sharp look-out for "eatables" which rose to the surface in escaping from the drain; there was a general rush for these tit-bits, which were eagerly fought for. One gentleman stated that on several occasions the larger Skuas were repeatedly seen to fly after the smaller species, and seizing their long tail feathers snip them off. The Pomatorhines were also seen to chase each other for the same purpose, and the smaller ones also. This was probably done to impede the rapid evolutions of the birds, and to enable the unmaimed to secure their food with greater certainty. Be this as it may, in the specimens that have come under my notice I have remarked that although the plumage has been quite mature, still the longer tail-feathers have been

wanting, and on examination I found them cut clean off; no doubt in the way described by Mr. Roberts. He received thirty specimens of the Pomatorhine Skua for preservation, and very many more were shot; and although he has carried on the business of a taxidermist in Scarborough for the last thirty years, he had never before obtained a single bird of this species.

On the 30th October, after a heavy gale from the N.E., Mr. Roberts was on his way to the Scarborough Museum at about 1 p.m., when he was startled by seeing a very large Eagle Owl flying quite low in one of the back streets. On arriving within ten yards of him, it rose with difficulty over the cottages and disappeared. The bird was immediately afterwards seen to alight in Lord Londesborough's grounds, by Mr. Robert Champley.

Of the *Falconidæ* occurring during the autumn and winter, the following have come under my notice:—Two Honey Buzzards, obtained at Londesborough. A fine immature male Hen Harrier in rich plumage shot on Kilnsea Warren. Peregrine Falcons were unusually abundant, and I am sorry to say that many were shot. Several Rough-legged Buzzards occurred in Holderness.

The severe weather of December brought many Swans, Geese, and Snipe to the Humber foreshore. Two Bewick's Swans were obtained at Brough during the month. A flock of Shore Larks were observed at Kilnsea on the 19th.

OCCASIONAL NOTES.

GREAT GREY SEAL IN KILLALA BAY, CO. MAYO.—The finest specimen of the Great Grey Seal, *Halicharus gryphus*, known to have been obtained in this locality for some years past, was shot near the Bag-nets at Ennis-crone, Killala Bay, about the 28th or 29th June last; it was a male, and measured eight feet in length, five feet eight inches in girth, and weighed 560 lbs. This Seal, with some others, had been annoying the fishermen all through the season by destroying the Salmon and scaring them away from the nets, and, though numberless shots had been fired at it, always escaped unharmed; but on this occasion when shot it was engaged in devouring a fine Salmon, which occupation probably rendered it less cautious and not so quick in its movements in avoiding danger. On receiving the ball through the hinder part of his head he sunk out of sight,

but was thrown ashore by the next tide, and even then retained a part of the Salmon between his jaws. Both *Halichærus gryphus* and *Phoca vitulina* frequent the bay and estuary in limited numbers, appearing more frequently during summer and autumn, when following the run of the Salmon, than at other seasons of the year. When the banks are exposed at low water, Seals may be seen resting on them at the edge of the channels in various parts of the estuary; but their favourite resting-place is a sand-bank in the estuary between Killala Bay and Moyne Abbey, when a small herd may be seen on most fine days basking in the sun. Some few years ago, when Seals were much more numerous than at present, I remember seeing a herd numbering twenty-five individuals of both species lying on that sand-bank, but quite safe from molestation, for there was no cover of any kind to conceal a shooter, the banks being very flat. Seals have remarkably quick sight and a most acute sense of smell, so much so that it is useless to attempt stalking them from leeward; and before I became aware of this fact many a long, wet, tiresome crawl I have had, reaching the edge of the banks only to find the deep impressions of their huge bodies on the soft sand. The size of the Seals taken about here varies from the small sucking calf up to the adult of 350 lbs., which is the heaviest I have met with, except the huge beast now recorded. But these weights are small compared with the weights of some Seals killed on the English coast; for Thompson, in his 'Natural History of Ireland,' speaks of one captured at the Farne Islands in December, 1851, and sent to the Ipswich Museum, weighing 770 lbs., and also of another Great Grey Seal, weighing 742 lbs., sent to the British Museum.—ROBERT WARREN (Moyview, Ballina).

THE ACCLIMATISATION OF WATERFOWL.—The sixth "Davis Lecture" was given in the Zoological Society's Gardens, on the 8th July last, by the Secretary of the Society, Mr. Sclater, who selected for his subject "Waterfowl," that is, as he explained the term, the order *Anseres*, family *Anatidæ*, of naturalists. After a preliminary account of the structure of the common duck, taken as a type of the whole group, and of the nine different sub-families into which the Duck family had been divided by naturalists, the lecturer remarked upon the principal species of Waterfowl that had been "acclimatized" in zoological gardens and ornamental waters, a purpose to which the present group of birds seemed to be specially suited. Of 174 species of Geese, Swans, and Ducks of various kinds which are now known to science, 94 had been introduced in a semi-domestic condition into zoological gardens, and of these 50 had been bred and reproduced young in captivity. Within the past twenty years the Zoological Society had been able to exhibit in its Gardens examples of 86 species of these birds, and at the present moment its collection contained not less than 270 individuals,

referable to 53 species, forming, it is believed, the finest living series of these birds in existence. Amongst the rarer species lately introduced and successfully propagated by the Society special attention was called to the Rosy-billed Duck of Chili, the Paradise Sheldrake of New Zealand, and the Trumpeter Swan of North America. In conclusion, the lecturer urged upon friends and correspondents of the Society the desirability of increasing the list of acclimatizable species of Waterfowl, and gave particulars of birds of this group to be found in various parts of the world which would make highly desirable additions to the Society's collection.

ORNITHOLOGICAL NOTES FROM GUERNSEY.—To those who take any interest in the Ornithology of the Channel Islands, it may be interesting to know that the following birds were shot in Guernsey or Herm during the last severe winter of 1879-80. I regret that I am unable to give the exact dates, but the majority were killed during the latter half of December. The list of species, all of them unusual in this locality, is as follows:—Pomatorhine Skua, Bean Goose, three Eider Ducks, Bittern, three Spotted Crakes, three Peregrines, two Rough-legged Buzzards, and a number of Long-eared Owls. It is, I believe, the first time that the Pomatorhine Skua has been taken in Guernsey. Last year there seems to have been an unusual migratory movement of all the Skuas along the east coast, which may perhaps account for a straggler finding its way to Guernsey. The Bittern and Crakes were killed in Guernsey; the Peregrines and Buzzards in Herm. The small and thinly populated island of Herm, about three miles from Guernsey, seems a very favourite resort for all birds. I have mentioned the Rough-legged Buzzards because of the time of year when they were killed. Mr. Cecil Smith, in his interesting book on the 'Birds of Guernsey,' seems to think that they generally leave the islands much earlier. However, a Buzzard, probably a Rough-legged one, was frequently seen throughout the winter near the Vallon, St. Martin's, Guernsey. It left about the last week in January. There was a large flight of Long-eared Owls over in Guernsey last winter. It was considered most unusual, though a few have occasionally been seen before. I have a fine specimen which a friend of mine shot when out Snipe-shooting one morning in January. There were numbers of Starlings in Guernsey last winter. Any evening about sunset large flocks might be seen flying to their roosting trees in the Vallon. On March 2nd and 3rd there was a tremendous gale from the S.W., when most of the Starlings left; a few, however, remain to breed. Whether this wintering in Guernsey be unusual I do not know; but Mr. Smith states that they generally leave in the autumn. Stonechats, too, remained in the island during last winter; on February 25th I saw a number on L'Ancrese Common. The Stonechat, though a resident with us, is migratory on the Continent, and in Guernsey likewise, according to

Mr. C. Smith. No doubt the severe weather, especially towards the end of November, drove many strangers to the islands, and caused others to remain the winter which usually leave during the autumn. Although the winter was very cold, yet in Guernsey little or no snow fell after November. I arrived there on December 10th, and have seen no snow since; there were some few hard frosts, though, in January. It is a curious fact that there are no Rooks in Guernsey; they have, however, several times come over for a while. During the autumn and winter of the Franco-Prussian war they came to Guernsey in great numbers and made an attempt at colonising; but, for some unknown reason, they all returned to France at nesting time. There are no Jays in Guernsey, while Magpies are as common as they are in France. I may add, in conclusion, that on March 16th I saw a Sand Martin near Mt. George, Guernsey, and one a few days afterwards by Moulin Huet Bay; after which I saw no more of the *Hirundinidæ* for some time. I saw and heard the Wryneck on March 30th.—JOHN VAUGHAN (Haselbury, Crewkerne).

BLUE EGGS OF THE CUCKOO.—During the last week of May, 1880, in company with Capt. Elwes, I spent a few days at Falconswaard, in Holland. The morning before we left, a boy brought us the nest of a Redstart, containing five eggs of the usual size and one of the reputed Cuckoo's eggs, at least double the weight of the others, but quite as blue, though there were a few pale spots upon the surface. In drilling this egg it was observable that the shell was much thicker than that of the others. All the eggs were highly incubated, and contained live young, which moved their feet when extracted from the large hole which I was obliged to make. The young of the Redstart had very slender feet, almost transparent. The young bird in the large egg was much larger, with comparatively large coarse feet, which were decidedly yellow in colour, and it was perfectly easy to see that the toes were arranged two in front and two behind. Capt. Elwes agreed with me that there could not be two opinions about this bird, which was unquestionably a young Cuckoo. So far this seems to set this much disputed question at rest. These blue eggs are not double-yelked Redstart's eggs, as has so often been asserted, but are veritable Cuckoo's, in some cases at least. My theory is that the Cuckoo which laid this egg was born in a Redstart's nest, and was consequently fed in early youth by a Redstart, and naturally seeks every year to lay her eggs in the nest of a Redstart. She was probably hatched from a blue egg, and probably always lays blue eggs. The theory that the Cuckoo is always able to assimilate the colour of her eggs to those of the species in whose nest she has an opportunity of placing them is one which requires proof in its favour before it can be accepted. During a previous visit to Hanover I had an opportunity of inspecting the fine collection of eggs of Herr Pralle, which contains a

remarkable series of ninety-two eggs of the Cuckoo. Of these twelve are blue, and, with the exception of four, were all taken from nests of the Redstart. Five of them were taken by Herr Baethe in the district Anhalt in 1869, on the following dates:—two on May 22nd, one on the 28th, one on June 13th, and one on July 6th—strong circumstantial evidence that they were laid by one and the same bird, and that consequently the same bird lays the same coloured eggs.—HENRY SEEBOHM (The Oaks, Alleyne Park, S.W.)

GULLS EJECTING PELLETS.—Is it a generally known fact that the larger species of Gulls eject the undigested portions of their food in the form of pellets, after the manner of Owls and other birds of prey? I have two Gulls, the Herring and Lesser Black-backed, running at large in the garden, and have noticed that they get rid of the indigestible part of their food in this manner. The pellets are composed chiefly of fish-bones, loosely packed together, from two to four inches in length. I have not met with any reference to this habit of Gulls in any ornithological work which I have read, and my own idea is that, as the birds do not get sufficient exercise in captivity, they are unable to digest their food so well as when in a wild state, and so are compelled to return those parts which are too hard for digestion. I have kept Kittiwakes and Common Gulls in confinement, but never noticed this habit in them.—T. H. NELSON (North Bondgate, Bishop Auckland).

[This habit of rejecting the indigestible portions of the food in the shape of pellets has been observed not only in the birds of prey and Gulls, but also in Rooks, Shrikes, and Flycatchers.—ED.]

NESTING OF MONTAGU'S HARRIER NEAR YORK.—I am glad to be able to record the nesting of Montagu's Harrier near York, and as this bird is now rarely found breeding in any part of Britain, perhaps a few notes concerning it will be interesting to the readers of 'The Zoologist.' In the spring of 1875 Mr. Widdas, a well-known naturalist both in Leeds and York, with two of his friends, was rambling through the woods in the neighbourhood of Stockton-on-Forest. They had been searching about for some time, when, on approaching some whin-bushes, out flew a Harrier, which, from its small size and general appearance, they concluded was Montagu's Harrier. Luckily for the bird, Mr. Widdas's gun was unloaded at the time, so they contented themselves with gazing after it until it disappeared. Advancing towards the spot from whence it rose, they were surprised to find a nest, containing one egg, placed on the top of some whins and brambles. As it was the first Harrier's nest they had seen *in situ*, some little time was spent in examining its structure. It was built about two feet above the ground, and was composed chiefly of rushes and other aquatic plants. It measured about one foot and a half in diameter.

In the centre was a hollow about the size of a boy's cap. Other materials used were cow-hair, moss, grass, &c. The egg is now in my possession, and differs very slightly from other eggs of Montagu's Harrier in my collection.—WALTER RAINE (Leeds).

GANNETS BREEDING IN CONFINEMENT.—In the month of September, 1874, I took four young Gannets on the Bass Rock; two more the following year, and a pair were sent to me in 1876. No bird is more successfully reared if the necessary food be provided. They feed best on Herrings, Mackarel, and Sprats, and it is seldom I have observed the remains of any other fish at their breeding quarters. The greatest difficulty is to find a suitable ground for their enclosure that will not cause corns on their feet. Grass grown on chalk appears to answer every purpose, and my birds are now perfectly healthy. Only two deaths have occurred in my small colony. One was found dead during the very hot weather in July, 1877, and the following winter one dived under the ice and was drowned. In 1879 one pair of the oldest birds built a nest, and a single egg was laid on June 8th. Owing, however, to the nest being dragged away by the younger birds, this egg was broken after having been sat upon for a week. This season the same pair built early in May, and after the nest had been left for a fortnight an egg was laid on May 19th. The male and female sat by turns, never leaving the egg but once, and then only for an hour or two. On June 30th the shell was cracked, and on July 1st the young bird was hatched. It is never left by the old ones, and is now apparently able to take food, being taken into the mouth of the old bird, who stretches her throat to the utmost and allows the young one to crawl up and help herself from her gullet. It is now nearly a fortnight old, so small that it might be put in a hen's egg; only a little white down on the head and part of back, the rest nasty black skin; beak white; eye dark.—E. T. BOOTH (Brighton).

[A coloured portrait of a young Gannet just hatched will be found in 'The Ibis' for 1866, p. 23, in illustration of a very interesting article on this bird by Dr. R. O. Cunningham.—ED.]

GANNET AT LLANBERIS.—While waiting for a boat on the bank of the Llanberis lake on June 24th, I noticed a large sea-bird, which I thought at first was a Black-backed Gull. It descended into the water with a tremendous splash, which made me observe it more carefully, and on rowing towards it I found it to be a Gannet in immature plumage, with white head and breast and dark back. It was not at all shy, and gave me a good opportunity of watching it with a glass. What brought it inland I am unable to imagine.—JULIAN TUCK (Llanberis).

MIGRATION OF THE REDBREAST.—In a recent number of 'Notes and Queries' (Jan. 10th, 1880, p. 35) the following extract is given from 'A New

Discovery of the Prelate's Tyranny' (Lond. 1641, p. 90), which is interesting to ornithologists, bearing as it does on the migration of the Redbreast. Dr. John Bastwick landed as a prisoner "at the Islands of Scylles [Scilly], when many thousands of Robin Redbreasts (none of which birds were seen in those Islands before or since) newly arrived at the Castle there the evening before [Oct. 15th, 1637] welcomed him with their melody, and within one day or two after took their flight from thence, no man knowes whither." Dr. Bastwick was an English physician in the time of Charles I., and a furious writer against the Church.—JOHN CORDEAUX (Great Cotes, Ulceby).

[The Redbreast is now known to be resident in Scilly. See Rodd's 'Birds of Cornwall and the Scilly Islands,' p. 300.—ED.]

BIRD-LIFE IN TCHUSKI-LAND.—When Prof. Nordenskiöld was in this country on his return from his extraordinary voyage round the eastern hemisphere, Mr. Seeböhm had the opportunity of having half an hour's chat with him, and learnt a few interesting particulars of his ornithological discoveries on the coast of Tchuski-land, about 150 miles west of Behring's Straits, where the 'Vega' was compelled to winter. The most interesting species which he mentioned was the Spoon-billed Sandpiper, *Eurynorhynchus pygmaeus*, of which a figure will be found in 'The Ibis' for 1869, p. 432. This bird, which in size is about equal to the Little Stint, and has a rufous plumage in the breeding season, has hitherto been considered so rare that a list was given in the paper referred to of all the specimens then known (1869) to be in existence. Prof. Nordenskiöld stated that this remarkable species was so common after the arrival of the spring migrants that a *dishful* frequently appeared on his breakfast-table! Another interesting bird which has not hitherto been recorded from the palaearctic region, and which also formed an important addition to the flesh-diet of Prof. Nordenskiöld and his fellow-travellers, was the Emperor Goose, *Cloephaga canagica*, a well-known Alaskan species. The Pacific Eider, *Somateria v-nigra*, also appeared in great numbers, as did likewise the Grey Phalarope, *Phalaropus lobatus*. Amongst the smaller passerine birds the most conspicuous was the insignificant Arctic Willow Warbler, *Phylloscopus borealis* (Blasius), which appeared on migration not by thousands, but by millions. We understand that a large number of skins were prepared during the voyage (amongst them one specimen of Ross's Gull), which have been sent to Stockholm, where in due course they will be examined and reported upon.

SISKIN NESTING IN BEDFORDSHIRE.—Seeing, at p. 257, a communication from the Rev. H. Burney, of Wavendon Rectory, near Woburn, to the effect that the Siskin had bred in his parish last year, and knowing him intimately, I have been in correspondence lately to get at the facts of the

case, as I was much inclined to be sceptical. He tells me that in visiting one of his cottagers this spring he saw a Siskin in a cage, and the woman told him that it was one of five that were taken from a nest by her eldest son, a trustworthy lad and one of his choir. The boy said that the previous June (1879) he found two nests, both with young, one built in the fork of a maple tree and the other in that of a hornbeam. One nest was in a rough high boundary fence to one of Mr. Burney's fields; the other not far off in a high field-hedge which had been left uncut for some years. Of nest No. 1 his mother sold four birds; of nest No. 2 only three were reared, of which Mr. Burney has one, one escaped, and one was drowned. One nest went to London, and the other was thrown away by the boy's mother. In a second note, in answer to another of mine asking him to describe the bird fully to me, he has done so, and the bird he has is clearly a hen Siskin. I told him I would send you a line on the subject when satisfied on the matter.—ROBERT H. MITFORD (Weston Lodge, Hampstead).

BUFFON'S SKUA.—I do not think I gave you the length of the projecting tail-feathers of the Buffon's Skuas which I got last autumn, and mentioned in 'The Zoologist' for January last (p. 18). The feathers in the tail of one, which I suppose to be a male bird, are I think unusually long, being eight inches and a quarter longer than the ordinary tail, while those of the other bird project six inches and a half. J. Russell told me recently that a gunner at the Teesmouth shot seven Buffon's Skuas on the 14th October, at the time the extraordinary flight occurred, and "made a pie of them!"—T. H. NELSON (North Bondgate, Bishop Auckland).

SALE OF GREAT AUKS' EGGS.—On the 2nd July last two eggs of this rare bird (now believed to be extinct) were offered for sale by Mr. Stevens, at his auction-rooms in King Street, Covent Garden, and, as might be supposed, attracted a large attendance of naturalists. These eggs, of which no history has as yet been discovered, formed part of an old private collection which was recently sold by auction in Edinburgh, and the whole of which was bought, we understand, by Mr. Small, bird-preserved, of that city, for thirty-two shillings! On being re-sold in London these two eggs alone realised respectively one hundred pounds and one hundred and two guineas! After a spirited competition both were knocked down to Lord Lilford. Photographs have been prepared of them, and may be obtained, we believe, through Mr. Stevens, 38, King Street, Covent Garden.

THE CLIFFS AT FLAMBOROUGH.—On July 17th I visited the breeding-places of the sea-birds at Flamborough Head, on the grand limestone cliffs between Bempton and Speeton. I had not seen the birds here for more than three years, and was glad to find them extremely plentiful. I thought them much increased in number since 1877, and the veteran climber, George

Londsbrough, with whom I discussed the question, quite agreed with me. Perhaps the extension of the close-time for the East Riding of Yorkshire till the 1st of September, and the decline of the fashion for wearing gulls' wings and breasts in ladies' hats, may account for the increase. The Kittiwakes especially seemed very abundant, and with a glass one could see on the ledges plenty of their black-collared young almost ready to fly. Puffins and Razorbills appeared to be more numerous in proportion to the Guillemots than formerly. Many ornithologists will, I daresay, be pleased to hear that this most interesting colony of birds is in such a flourishing condition. Peregrines did not breed on the cliffs this year, a pair which were seen in the winter having fallen victims to the gun.—JULIAN G. TUCK (Scarborough).

NESTING HABITS OF THE STARLING.—Starlings nesting under the eaves had young by the first week in May, which left the nest by the end of the month, though for the most part imperfectly fledged. One was killed by a fall, another could fly but a yard or two, though the parent birds were assiduous in their endeavours to entice it out of harm's way, by offering it food and then withdrawing it, the young bird the while open-mouthed and clamorous to be fed. This being repeated time after time they at length succeeded in getting it under cover. It is somewhat remarkable that there were young of three sizes in the same nest. The scarcity of summer migrants in the Undercliff this summer is noteworthy, particularly in the case of the Hirundines. Hardly any of these birds are to be seen, and none, that I am aware of, are nesting here.—HENRY HADFIELD (Ventnor, Isle of Wight).

HERONS NESTING AT HEMPSTEAD, NORFOLK.—Heron have nested this year, for the first time, at Hempstead, in this county, but apparently only a single pair. The nest is in a medium-sized Scotch fir in the heart of a large wood composed of these trees. I could not scale it; but, from the broken egg-shells at the bottom, there is no doubt that the young were sitting in the trees near.—J. H. GURNEY, JUN. (Northrepps, Norwich).

CORMORANT WITH WHITE FEATHERS IN THE TAIL.—I have lately received from my taxidermist, J. Russell, of Middlesborough, a female Cormorant which I shot at the Teesmouth, October, 1879, three of the tail-feathers being partially white from the tip to about two inches above.—T. H. NELSON (North Bondgate, Bishop Auckland).

SHORT-FINNED TUNNY AT PENZANCE.—On June 26th I received a specimen of the Short-finned Tunny, caught in the nets of our Mackarel-fishers. It was over twenty-three inches in length, and marked on the

back so much like a Mackarel that a casual observer might well have taken it for a giant Mackarel. Its weight was about six pounds.—THOMAS CORNISH (Penzance).

THE SHELL SLUG IN SUSSEX.—To what Mr. Borrer has recorded (p. 222) with regard to *Testacella haliotidea* in Sussex, I have to add that I found it last year in a large semi-public garden belonging to Park Crescent, and adjoining the "Level," near the middle of Brighton; but probably Mr. Harting will say that his remark as to origin applies more forcibly to this locality than to the Horsham one.—ROBERT M. CHRISTY (Saffron Walden). [Most likely introduced in both localities.—ED.]

PROCEEDINGS OF SCIENTIFIC SOCIETIES.

LINNEAN SOCIETY OF LONDON.

Anniversary Meeting, May 24, 1880.—Prof. ALLMAN, F.R.S., President, in the chair.

At this, the ninety-second annual general meeting, there was a large attendance of the Fellows. The President, after a few introductory remarks of congratulation on the prospects of the Society generally, referred to the deaths of several of the oldest members, among others, Prof. T. Bell (*æt.* 87), J. Miers (*æt.* 91), Gen. Munro, Dr. David Moore, W. Wilson Saunders, E. W. Cooke, R.A. (Fellows), and T. Atthey (Associate), besides several Foreign Members of high standing. The Secretary (Mr. F. Currey) reported that since the last anniversary the Society had lost by death ten Fellows, three Foreign Members, and one Associate, and three Fellows had withdrawn; on the other hand, there had been an accession by election of twenty-eight new Fellows, three Foreign Members, and four Associates. The Treasurer (Dr. J. Gwyn Jeffreys) read his financial report, and on resigning office congratulated the Society on its increasing prosperity. The ballot for Council and Officers was proceeded with, when Prof. G. J. Allman was re-elected President; Mr. Frederick Currey (the outgoing Secretary), Treasurer; Mr. B. Daydon Jackson, Botanical Secretary; and Mr. E. R. Alston, Zoological Secretary. Professor Allman then delivered his annual address, his subject being "The Vegetation of the Riviera; a Chapter in the Physiognomy and Distribution of Plants."

June 3, 1880.—Professor G. J. ALLMAN, F.R.S., President, in the chair.

A paper, by Dr. Francis Day, "On the specific identity of *Scomber punctatus*, Couch, with *S. scomber*, Linn.," was read. The specimen of

Mackarel on which this opinion is founded was captured on the coast of Cornwall in April last, and through Mr. Dunn, of Mevagissey, kindly transmitted to the author.

In a note "On the Anal Respiration in the Zoea larva of the Decapod Crustacea," Mr. Marcus M. Hartog showed, from an examination and study of the living larvæ of *Cancer*, that the terminal part of the rectum is slightly dilated, and possesses a rhythmic contraction and expansion duly associated with opening and closing of the anus. A clue to the ultimate transference of branchial respiration may perhaps be found in the Entomostraca, where in certain forms food is obtained by a current from behind forwards, due to the movement of the setose or flat limbs immediately behind the mouth. Prof. Claus has shown that in *Daphnia* these limbs have a respiratory function, while this animal also possesses a well-marked anal respiration.

In a paper "On the Genus *Solanocrinus*, Goldfuss, and its relations to recent *Comatulæ*," Mr. P. Herbert Carpenter arrived at the following conclusions:—(1) In all the Jurassic and in some of the Cretaceous *Comatulæ* the basals are the embryonic basals which have undergone no further modification than those of many *Pentacrinus* species. Their relative size is reduced, as they do not quite separate the radials from the top stem-joint, even when they appear externally, which is not always the case, both individuals and species varying greatly in this respect. (2) In all the recent *Comatulæ* and many Tertiary and Cretaceous species the embryonic basals undergo an extensive modification resulting in the formation of a rosette. In many cases basal rays extend outwards from this, and may appear externally; but they are only analogous, and not in any way homologous to the true basals of the older *Comatulæ*. (3) Most *Pentacrinini* have a more or less complete circle of basals separating the top stem-joint either partially or wholly from the radial pentagon. But in some few fossil forms there are no external basals, as may also be the case in *Enerinus*. (4) The variations in the development of the basals are useless as generic distinctions; Schlüter, therefore, was perfectly justified in uniting *Solanocrinus* with *Antedon*. He does the same with *Comaster*, though from Goldfuss's description of this type it appears to Mr. Carpenter to differ so much from all other *Comatulæ* that he prefers to regard it as generically distinct.

June 17, 1880.—Professor G. J. ALLMAN, F.R.S., President, in the chair.

The following gentlemen were elected Fellows of the Society:—The Rev. H. G. Bonavia Hunt (Trinity College, London), H. N. Moseley (Univ. of Lond.), the Rev. A. Merle Norman (Durham), and E. A. Webb (Turnham Green).

Lord Lilford exhibited, and remarks were made on, a series of skins, skulls and horns of the Wild Sheep of Cyprus, *Ovis ophion* (Blyth).

Mr. F. Crisp exhibited slides, prepared at the Zoological Station of Naples, illustrating the early stages of the life of Invertebrates.

A paper was read by Mr. F. Maule Campbell, "On certain Glands in the Maxillæ of Spiders." These glands, to which he attributes a secretory function (probably salivary), are found in *Tegenaria domestica*, have apertures on the inner side of the upper face of each maxilla thence inclining towards the mouth. They are ring-like in figure, with an enclosed disk, and with tegumentary folds at their outlets. The glands and apertures increase in number with age, and the ducts tend to become chitinous. Glands varying somewhat in structure, but evidently similar in kind, exist in species of *Linyphiidæ*, *Theridiidæ*, and *Epeiridæ*.

Mr. Stuart O. Ridley made a communication "On two cases of incorporation by Sponges of spicules foreign to them." In a species of the genus *Ciocalypa*, Busk, the dermis contained spicules which belonged to a species of *Esperia*, and which latter sponge had been obtained in the same haul of the dredge. In another example of *Alebion*, spicules also derived from *Esperia*, were likewise obtained. Thus, the author points out, an element of error might arise from one sponge containing skeletal structures accidentally derived from a neighbouring sponge of a different genus and habit.

Prof. Allman called attention to a remarkable Medusa first observed by Mr. W. Sowerby in the fresh-water tank containing the *Victoria regia* at the Botanic Gardens, Regent's Park. He described the specialities of this small but elegant organism, whose congeners are altogether marine in habit. How the swarms could have come into or been developed in the tank, for the present remains doubtful, for no fresh water had been put into the tank for some years, nor has any sea-water been added, or other material likely to have contained ova been introduced. The name *Limnocodium Victoriae* has been given by Prof. Allman to this heretofore unknown form. A short note from Prof. Lankester concerning this same Medusa was also read, and living specimens were exhibited by Mr. F. Crisp.

Mr. F. M. Campbell communicated a second paper "On the stridulating organs of *Steatoda guttata* and *Linyphia terebricola*." A stridulating organ has already been described by Professors Westering and Mason Wood in certain other spiders; the present observations demonstrate its existence in both sexes, and the essentials of the structure are now given in detail.

Dr. J. E. Dobson, in "Notes on *Aplysia dactylomela*," a specimen obtained at Bermuda, but not distinguishable from the species inhabiting the Cape Verde Islands, showed that there is inequality of size of the right and left moiety in the dental rows of the lingual ribbon, and he described other structures appertaining to the mandibular plates.

Mr. G. Busk communicated some researches on the Polyzoa collected in the late North Polar Expedition. Several interesting and new forms are given, while the author expressed himself as differing in his determination in certain cases from that arrived at by Prof. Smitt, of Stockholm.

A paper "On the Natural Classification of the Gasteropoda" (Part I.), by Dr. J. D. Macdonald, was read. He refers to a paper of his published by the Society twenty years ago, wherein sexual characters, lingual dentition and auditory concretions formed the basis of classification. With modifications this is elaborated, and in certain groups additional value is accorded to the lingual and labial dentition.

The sixth contribution to the "Mollusca of the 'Challenger' Expedition," by the Rev. R. Boog Watson, wherein the author treats of the *Turretellidæ*, and describes nine new species, was taken as read.

A paper by Sir John Lubbock, Bart., M.P., was read, namely, "Observations on Ants, Bees, and Wasps, with a description of a new species of Honey Ant." In this, his seventh contribution on this subject, Sir John related his fresh experiments on their powers of communication.—J. MURIE.

NOTICES OF NEW BOOKS.

A Classification and Synopsis of the Trochilidæ. By DANIEL GIRARD ELLIOT, F.R.S. 4to, pp. 277. Philadelphia, 1879.

IN this important monograph, which forms No. 317 of the "Smithsonian Contributions to Knowledge," Mr. Elliott has described every species of Humming-bird known to him which in his opinion is entitled to a separate rank; and those who have not made any special study of these very beautiful birds will probably be surprised to learn that no less than 426 species are recognised. This is a fewer number of species than had been described by previous writers, but Mr. Elliott, after a careful examination of specimens and descriptions, has satisfied himself that a great many forms previously supposed to be distinct, and described under different names, are in reality inseparable, and he has accordingly united them.

From the partial examination which we have been able to make of this work, we believe that the number of species might be still further reduced with advantage; for we fail to perceive either the necessity or desirability of recognising as specifically

distinct such forms, for example, as *Campylopterus obscurus*, Gould, which we cannot but regard as a mere variety of *Campylopterus largipennis*, Boddaert.

Mr. Elliot recognises 120 different genera, and deems it inexpedient to adopt any division into subfamilies. In his Preface he says:—

“ Generic division has been carried probably to a greater extreme among these birds than in any other group known in Ornithology, and there remains but comparatively few species that have not been made to stand, at one time or another, as the representative of some so-considered distinct generic form. In the present ‘Synopsis’ the recognition of genera has been carried to the farthest limit that seemed practicable, and in every case it has been attempted to give structural characters for the genera which have been acknowledged. Of course to those ornithologists who consider that colour of plumage is sufficient to establish ‘genera,’ my treatment will not be acceptable, but in this ‘family,’ at least, where it is not infrequently observed that individuals of the same species vary from each other in the hues of their plumage to a great degree, colour unsupported cannot be regarded as worthy of any consideration as a ‘generic’ character, and if structural ones exist sufficient for the establishment of a genus, then the hue of the plumage is immaterial.”

Mr. Elliot’s arrangement of the species, we observe, is different from all those heretofore proposed. It is by no means fanciful, however, but has been arrived at by a careful comparison of the species described, 380 of which, out of 426, are represented by specimens in Mr. Elliot’s collection; while of the remaining ones, with but few exceptions, he has examined the types.

The descriptions given are concise, considerable assistance being afforded by the “Key to the species” of each genus, and the outline engravings of the more important portions of the structure relied on for the establishment of the genera.

We have thus a very concise and well-digested ‘Synopsis’ of the *Trochilidæ*, which will be consulted with satisfaction by all who desire information on this very attractive, but very puzzling, group of birds.

It is not to be supposed, nor does Mr. Elliot profess, that it is complete; for many of the species described by him are still very imperfectly known, and we have yet a good deal to learn about their habits, nidification, and geographical distribution, so many of the rarer forms having been received from collectors

without any information whatever concerning them. As an instance we may refer to the very remarkable *Loddigesia mirabilis*, Bourcier, of which Mr. Elliot remarks (p. 145), "We know very little about it, the type still remains unique, and even the precise locality the species inhabits has never been ascertained."

While these lines, however, were being printed in Philadelphia, a collector for the Warsaw Museum, Herr Stoltzmann, was in Peru, where, in September, 1879, in the environs of Chachapoyas, he rediscovered this species, of which no specimen had been seen since the type was procured in 1836; and not only ascertained that its home is in the district just named, where it is rare, but also satisfied himself by enquiries that the original type specimen, which belonged to the late Mr. Loddiges, was shot at Quipachacha, about three leagues from Chachapoyas.

This intelligence, made known to English ornithologists in 'The Ibis' for January last, was, of course, not available to Mr. Elliot, whose work was then printed, or it would have formed a most interesting addition to his notice of this still rare species.

The Birds, Fishes, and Cetacea commonly frequenting Belfast Lough. By ROBERT LLOYD PATTERSON, Vice-President of the Belfast Natural History and Philosophical Society; President of the Belfast Chamber of Commerce. 8vo, pp. 257. London: Bogue. Belfast: Marcus Ward & Co. 1880.

So many years have elapsed since any publication in book-form on the fauna of Ireland has appeared, that it is refreshing to find a resident naturalist coming forward to give us the result of his personal observations on the natural history of the district in which he resides.

The text-book on the fauna of Ireland has long been Thompson's work in four volumes, the last of which containing the Mammalia, Fishes, Mollusca, and Crustacea, was published in 1856; Mr. Watters' little book, 'The Natural History of the Birds of Ireland' having appeared while Thompson's work was in progress, namely in 1854. Since that date it may be said that contributions to the fauna of Ireland have been confined to scattered papers in various periodicals, and the 'Proceedings'

and 'Transactions' of Scientific Societies. We ought not, however, to pass unnoticed the 'Guide to Belfast' by the "Belfast Naturalists' Field Club," published on the occasion of the British Association Meeting held in that city in 1874.

The example set by a Vice-President of the Belfast Natural History Society is one which others equally favourably located in Ireland would do well to imitate, for it may be asserted with truth that we still know comparatively little about the fauna of the sister Isle. We should have learnt more had Mr. Patterson resided in any other part of Ireland than Belfast, the former home of the late William Thompson, who so thoroughly investigated the natural history of the district. In other words, it is almost to be regretted that Mr. Patterson, instead of going over the same ground, did not make choice of some other district in which to exercise his evidently keen powers of observations.

Not that he has been unable to tell us anything new concerning the fauna of Belfast Lough, for his book contains some interesting original observations, but there would have been greater novelty in his remarks had they resulted from an investigation of any other part of Ireland. This is evident from the frequent reference which he has been compelled to make to Thompson's well-known work. His book would have been stamped with more originality had it contained fewer extracts from the 'Natural History of Ireland,' and it would have been decidedly improved by the omission of numerous quotations from the works of Bishop Pontoppidan, the late Dr. Saxby, Mr. Lamont, Mr. Robert Gray, and others, which, although excellent in their way, have nothing whatever to do with Belfast Lough.

Those who have never read the works so freely quoted by him will doubtless thank him for the extracts, but those to whom they are already familiar (and we suppose that this applies to most naturalists) must feel disappointed that the volume does not contain more from Mr. Patterson's own pen, or less from the pens of other authors.

Although intentionally discarding systematic arrangement, for reasons given in his Preface, Mr. Patterson has nevertheless set down his observations in very orderly method, and in a very agreeable style.

The Birds of Cornwall and the Scilly Islands. By the late EDWARD HEARLE RODD. Edited, with an Introduction, Appendix, and Brief Memoir of the Author, by JAMES EDMUND HARTING. With portrait of Mr. Rodd, and Map. 8vo, pp. 320. London: Trübner & Co. 1880.

It will be admitted by all readers of 'The Zoologist,' who for so many years have been in the habit of perusing his frequent communications to this journal, that no one was better qualified to write an account of the Birds of Cornwall than the late Edward Hearle Rodd. His long-expected book has at length appeared, and contains in about three hundred pages, the sum and substance of forty years' observation in a county less known, perhaps, to naturalists than any other in England.

In an Introduction of fifty-six pages, the Editor has given a bibliographical notice of works relating to the natural history of Cornwall, from William of Worcester's 'Itinerary' in 1478, to the second edition of Mr. Rodd's 'List of Cornish Birds,' which was printed in 1869; thus leading up to the present volume.

For reasons which will be obvious to our readers, we abstain from offering any criticism; but we may be excused, perhaps, for pointing out that the Introduction contains some interesting letters written by a Cornish ornithologist in the time of Queen Anne, which have hitherto escaped notice; while the "Appendix" includes some additions to the notices of rare birds mentioned in the body of the work, besides a "List of Cornish Names of Birds," and a "List of Provincial Names of Birds now or formerly in use in Cornwall." A clear map of the county, prepared by Mr. Stanford, shows at least ninety per cent. of the localities mentioned or referred to in the text.

A Descriptive List of the Birds of Nottinghamshire. By W. J. STERLAND and J. WHITAKER. 8vo, pp. 71. Mansfield: W. Gouk. 1879.

MR. STERLAND's name will be familiar to our readers as that of the author of 'The Birds of Sherwood Forest,' reviewed in 'The Zoologist' for October, 1869; while the name of Mr. Whitaker is almost equally well known from his contributions to this Journal on the Ornithology of the district in which he resides.

The thin octavo volume now before us contains a carefully prepared list of Nottinghamshire birds by these two gentlemen, supplemented by notes on the species, many of which are very interesting. Amongst these we may particularly notice the reported occurrence of the Hobby in mid-winter, of which three instances are given (p. 71); the capture of a North American Buzzard, *Buteo borealis*, identified by Mr. Gould (p. 9); the breeding of the Black Redstart between Ollerton and Edwinstowe (p. 16), previously recorded in 'The Birds of Sherwood Forest'; the occupation of a Sparrow's nest in winter by a family of Golden-crested Wrens (p. 18); the occurrence of the Bearded Titmouse in a willow-bed at Toton (p. 20); and the American White-winged Crossbill at Edwinstowe (p. 26); the breeding of a colony of Rock Doves, *Columba livia*, in a steep bank near the Trent at Colwick (p. 35); and the occurrence in the county of the Red Grouse, and Pallas's Sand Grouse (pp. 35, 37).

A specimen of the Yellow-shanked Sandpiper of America, recorded by Yarrell to have been procured at Misson, Lincolnshire, is claimed by the authors of the List before us as a Nottinghamshire specimen, on the ground that Misson is "just within the northern border of the county." In the same way they lay claim to an example of the Caspian Tern which had been recorded by Mr. Footit ('The Zoologist,' 1853, p. 3944) as having been obtained at Caythorpe, Lincolnshire.

The account given by Mr. Whitaker of the breeding of the Tufted Duck at Rainworth is very interesting, and should induce sportsmen to encourage as much as possible the observance of the close-time for wildfowl.

Desfontaines's "*Mémoire sur quelques nouvelles espèces d'Oiseaux des Côtes de Barbarie*," originally published in the '*Histoire de l'Académie Royale des Sciences*,' 1789. Edited by ALFRED NEWTON, M.A., F.R.S., &c., and reprinted for "The Willughby Society." Thin 4to, with seven full-page facsimile engravings. London, 1880.

IN 'The Zoologist' for April last (p. 159) we took occasion to refer to the publication by "The Willughby Society" of a reprint of Tunstall's '*Ornithologia Britannia*,' and directed attention to

the object of this Society, namely, the reproduction of scarce ornithological works.

We have now before us, through the same channel, a reprint of Desfontaines's "Mémoire," of which the full title is given above. This is the sole contribution to Zoology which has come down to us from the pen of this distinguished botanist.

The Editor's Preface informs us that Desfontaines left Marseilles for Algiers in 1783, for the purpose of investigating the geography, antiquities, and natural history of the Barbary States. In 1786 he returned to Paris, where he was appointed a Professor at the Jardin des Plantes, and where he intended to have published a narrative of his travels in Barbary, had not the MS. been unfortunately lost during the revolution.

The present "Mémoire," which was published in 1789, contains detailed descriptions and engravings of seven different birds which he procured in Barbary, and which at that date were either undescribed or very little known.

We observe that the two reprints now issued by "The Willughby Society" do not range in regard to size, the former being a demy octavo, the present work a quarto. Doubtless the "Mémoire" of Desfontaines could not have been printed on smaller paper on account of the plates; but the "Ornithologia" of Tunstall might well have been larger, which would, in truth, have been an improvement; for, having been reduced by photography from folio, the diminutive lettering, compressed into eight columns on an octavo page, is excessively trying to readers who are not blest with the eyes of youth.

At all events, it is due to Mr. Tegetmeier, under whose superintendence these reprints have been produced, to say that no pains seem to have been spared in the execution, both as regards the letterpress and the plates. In the present "Mémoire" the plates are facsimiles, while the text is a *verbatim et literatim* reprint in type as nearly like the original as possible. The original pagination is, of course, preserved, and thus one of the objects in view is secured, which is, to enable ornithologists to consult and quote the reprint with the same advantage as if quoting the original work, of which, from its rarity, it might never be their fortune to see a copy.

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FIELD NOTES ON THE REED AND MARSH WARBLERS.

BY HENRY SEEBOHM, F.Z.S.

THE Reed Warbler and the Marsh Warbler are closely allied species. Some English ornithologists, who from some cause or other have never made the personal acquaintance of both species, have refused to admit their distinctness. No doubt they are very closely allied; but in their song, habits, eggs, and geographical distribution they differ as much as a Blackbird differs from a Thrush. A newly moulted example, either after the spring or autumn moult, of the Reed Warbler can always be distinguished from a Marsh Warbler by the russet-brown of its rump and upper tail-coverts, which in the latter species are olive-brown. Examples in which the plumage is much abraded are, of course, somewhat difficult to distinguish.

The Reed Warbler is seldom found where reeds and flags do not abound, and in these reed-beds it generally builds its nest, and lays eggs having greenish brown spots upon a pale greenish brown ground. The Marsh Warbler, on the other hand, is seldom found where willows do not grow, and it prefers to build its nest in willow trees, often six feet or more from the ground. The ground colour of the eggs is almost white, and the spots consequently are much more conspicuous, and are greyer in colour. The range of the Reed Warbler extends further west. In many places in England it is a common bird, whilst in South-east Russia it is said to be very rare. The Marsh Warbler, on the contrary, has only doubtfully

been recorded as a British bird, but is common on the lower Volga.

The most striking difference—at least in the eyes, or rather in the ears, of a field ornithologist—is, however, to be found in the song of the two species. I had long wished to make the personal acquaintance of the Marsh Warbler, and having a morning at my disposal in Hanover, where both species are common in certain localities, I placed myself under the guidance of my friend Herr Post-Director Pralle, who undertook to introduce me to both species. Half an hour's walk from the city brought us to the banks of a river near Herrenhausen, where we found extensive reed-beds on both sides. We laid ourselves down on the grass and listened to the song of the Reed Warblers, which were hidden in the reeds and were singing lustily. The song is scarcely so loud as that of the Sedge Warbler, but nearly as harsh, and is seldom if ever varied by the more melodious flute-like tones which the Sedge Warbler introduces when in full song.

After having listened to the Reed Warbler until its song was thoroughly impressed upon our memories, we walked about a mile along the banks of the river until we came to a locality where willows took the place of reeds. We had no sooner arrived than we had an excellent opportunity of listening to the Marsh Warbler. The bird was singing brilliantly, perched in full view on the top of a willow bush. It is an incomparably finer singer than its near ally. It sings quite as loud, but its voice is much more melodious, and far more varied. Sometimes one might imagine that one was listening to the song of a rich-voiced Reed Warbler; but more frequently the melody reminded one of the songs of the Swallow, the Lark, or the melodious Willow Warbler, and often we came to the conclusion that the bird had taken lessons from a Nightingale or a Blue-throat. My friend maintained that the song was finer than that of the Nightingale. It was not nearly so loud, but almost as rich, and much more varied. The Marsh Warbler was common for some miles, and we listened with great pleasure to perhaps a score individuals, which generally allowed themselves to be seen, though occasionally they remained concealed in the trees; and after spending some hours amongst them, and afterwards returning

to the reed-beds where the Reed Warbler alone was to be heard, we came to the conclusion that no one who has ever heard the songs of both birds could ever think of uniting them as one species.

The date was the 21st of June, but both species were in full song. Like the Nightingale, the Marsh Warbler sings long after sunset, and perhaps midnight is the best time to hear the song to perfection.

ON THE CRY OF THE WHITE AND BROWN OWLS, AND THE SONG OF THE REDWING.

BY THE REV. A. MATTHEWS, M.A.

SOME years ago a good deal was said and written on the respective hooting and screeching of the White and Brown Owls. I myself took some part in the discussion, and have since regarded the controversy as a thing of the past; but Mr. Hart's note, in the June number of 'The Zoologist' (p. 254), has once more drawn attention to the subject, and induced me, while referring to what I have already stated, to add some facts of more recent observation.

No one could have enjoyed better opportunities for studying the life-history of these Owls than did my brother and myself. While boys we reared from the nest a young Brown Owl, which became so perfectly familiar that confinement was wholly unnecessary. From the first he enjoyed unrestricted liberty; as soon as he could fly he would accompany us wherever we went, and answer our call as obediently as a dog. His tameness continued after he had arrived at maturity, and although in the following spring he was often visited by wild birds of his own species, he never evinced any inclination to associate with them, his sole delight appearing to be centred in his masters. This state of things continued for two years, and it is needless to add that during that time we had abundant means of hearing every sound of which his voice was capable, and yet never heard any which at all approached a screech.

Our acquaintance with White Owls was carried on under equally favourable conditions. The tower of the parish church at Weston-on-the-Green, in Oxfordshire, is a solid square structure,

and stands within fifty yards of the parsonage house. This tower was annually, and may still be, the breeding quarters of birds of this species, and also their usual resort in the daytime at all periods of the year. Moreover, the greater part of the land in the parish was arable, and large barns were conspicuous in every farmyard. Consequently White Owls were among the commonest of the feathered tribes, and in the dark their vicinity would often be announced by a protracted and discordant screech.

In 1854 we left Weston-on-the-Green, the scene of the foregoing observations, and removed to our present home in Leicestershire. Here we found matters reversed, and Brown Owls by far more numerous than their allies. Our garden is very large, and contains within its precincts a portion of a large wood, by which it is bounded on the eastern side. This wood is the residence of many Brown Owls, and in 1877 a pair of these birds built their nest in a clump of fir trees in our own garden; they might be seen at any time throughout the summer. Often in the day, and always by night, loud and oft-repeated hootings proceeded from the trees around the nest; but I never heard a single screech.

Such has been my own experience, and such the opportunities of observation for a period of more than thirty years. I am therefore able distinctly and positively to assert that the normal cry of the Brown Owl, *Syrnium aluco*, is that "hoo-oo-oo-oo," known by the term "hooting," and that the normal cry of the White Owl, *Strix flammea*, is that discordant "screech," the fruitful cause of much alarm to superstitious minds, and, as I think, of much error to some naturalists. I cannot, and do not, assert that the White Owl is incapable of hooting; nor, on the other hand, that the Brown Owl is incapable of screeching. All that I can say in the matter is that I never heard a White Owl hoot, or a Brown Owl screech; and that it would require the positive and personal testimony of an ornithologist whose knowledge of these birds was beyond question to convince me that either species emits sounds so unusual to it.

The call-note of both species is almost exactly similar; it is often repeated as a prelude to their more specific noises, and may possibly have led to mistakes; but this does not affect anything that I have said, for I have often *seen* the Brown Owl hoot, and still more frequently have *seen* the White Owl screech, both on

the wing and at rest on the ridge of our house. Indeed it is a common habit of the latter species to utter its cry while flying, though I cannot remember that I ever saw a Brown Owl do so. Thus I have the evidence of my eyes, as well as my ears, to convince me of the truth.

It must not for a moment be supposed that the instances of optical evidence to which I refer occurred in doubtful twilight; on the contrary, all, or nearly all, were under the full light of the sun. The hooting which I have *seen* proceeded, of course, from our tame bird, either sitting on the lower branch of a tree or perched by my side on a garden seat. The screeching which I have *seen* was emitted by the parent birds in the act of bringing food to their young in the church-tower. When the young are grown large and require a liberal supply of food, the rapidity with which the old birds procure mice is almost incredible; it would really seem that they had an endless supply stored up ready for use. Many times in the course of each hour, from morning till night, one or other of the old birds might be seen returning to the tower, dangling below him at the full length of his long legs a mouse which he had just captured, and often as he approached sounding the dinner-bell *more suo* with a ringing screech.

In deference to the late Sir W. Jardine, I will not attempt to explain, much less to contradict, his oft-quoted statement; but, admitting its truth, I do not think that an isolated fact unsupported by further evidence can outweigh the result of continuous observation extending over a period of more than thirty years.

The greater part of the foregoing remarks were published long ago in "An Account of the Birds of Oxfordshire" (Zool. 1849). Soon after this had appeared, Mr. Morris, taking shelter under the wing of Sir W. Jardine, impugned the correctness of our premises, and declared our arguments to be inconclusive. As protracted controversies generally become tedious, as well as for other reasons, I did not at that time consider it worth my while to notice his criticisms. In the above history of my own experience, I now give the best, and in truth the only reply I can make; facts are stubborn things, and when founded upon original and actual observation are, I think, far more conclusive than ideas inspired by the statements of others.

These reminiscences of former days have brought to my recollection another and very similar subject—similar as to the tenour of the facts recorded, but far exceeding the history of the Owls in the amount of contradiction which it provoked. In the March number of 'The Zoologist' for 1864 (p. 8946) I related the fact of having myself on several occasions heard the Redwing singing in England, and detailed the circumstances of my observations at some length.

As soon as my note appeared it attracted a host of assailants, who seemed to strive who should contradict my assertion the most flatly. The greater part of their remarks, however, were conspicuous for a total absence of proof, and mainly consisted in the repetition of what had been written by others; but one and all seemed impressed with the idea that because they themselves had never heard the song of the Redwing in this country, it must naturally follow that no one else could possibly do so; although it is well known that Redwings do not leave us before the end of March, and it is equally well known that for a long time anterior to that date Thrushes will be in full song, especially when the season is forward and the weather warm. Some of these criticisms, indeed, were not more remarkable for the absence of anything like proof than for being deficient in common courtesy. Not content with implying that I was unable to understand the subject on which I had written, and could not distinguish twittering from a full song, one presumed to insinuate that I did not even know a Redwing from a Song Thrush, and another to suggest that I should immediately forward the specimen to him for determination! At length these attacks received a well-merited rebuke from the pen of the Rev. A. C. Smith (Zool. 1864, p. 9209), whose intimate acquaintance with the Redwing in its native haunts was indisputable; and after that I felt quite satisfied to let the matter drop.

But I now call the attention of my quondam assailants to a paragraph in 'Wild Life in a Southern County,' quoted at length on p. 192 of 'The Zoologist' for last year, in which the writer says:—"One spring I was struck day after day by hearing a loud, sweet, but unfamiliar note in a certain field. In a little while I succeeded in tracing it to an oak tree. I got under the oak tree, and there on a bough was a Redwing singing with all its might. This Redwing was singing sweet and loud, far louder than the

old familiar notes of the Thrush. The note rang out clear and high, and somehow sounded strangely unfamiliar amongst English meadows and English oaks. Then looking farther, and watching about the hedges there, I soon found that the bird was not alone; there were three or four pairs of Redwings in close neighbourhood, all evidently bent upon remaining to breed. To make quite sure I shot one. Afterwards I found a nest, and had the pleasure of seeing the young birds come to maturity, and fly."

Whoever the author of 'Wild Life in a Southern County' may be, he has evidently some knowledge of Ornithology, and his knowledge, moreover, has been derived from personal observation.* It is, therefore, no small gratification to me to find that it may now be considered within the bounds of possibility that I did hear the song of the Redwing in Oxfordshire on the occasion to which I have referred.

ON THE CHANGE OF COLOUR IN THE BOAR-FISH, AND THE GROWTH OF THE TURBOT.

BY FRANCIS DAY, F.L.S.

IN the tanks of the Westminster Aquarium are five examples of the Boar-fish, *Capros aper*, which are well worthy of a visit from anyone interested in observing how fishes may change colour under altered conditions of life.

On the 18th of June I happened to be present when sixteen examples arrived from Mr. Dunn, of Mevagissey, and, never having seen them in a state of nature, I took notes respecting their appearance. They were all of a rich red hue, as observed in some Gold Carp, while most of them had a dark band over the base of the tail just before the origin of the caudal fin; the outer edge of the ventrals was also dark-tipped. One had faint traces of vertical bands, and another had a row of black spots along the base of the dorsal fin.

On July 12th I again visited these fish. The tank in which they are placed is rather dark, while the water is not very clear. They all seem in good health, are lively, but strangely altered in

* Since this book was published anonymously, the author, Mr. Richard Jefferies, has in subsequent volumes disclosed his name.—ED.

colour. They may be described as being of a straw-colour, with broad dark vertical bands of a deep brown hue. The first passes over the head; the second from the first dorsal fin down to the outer third of the ventral; the third from the second dorsal, curving downwards and rather backwards to the anal fin; while the fourth band is over the free portion of the tail, the outer edge of which is white. Looking down from above upon these fish the bands are seen to meet on the back, while after death they almost entirely disappear.

Irrespective of the colours observed in this fish, a few notes may be of interest respecting its occurrence during the last half century, and rapid increase along our southern shores. The first capture recorded in the British Isles was in Mount's Bay, October, 1825; then solitary examples at Bridgwater, in 1833; at Teignmouth about the same time; at Lossiemouth in 1839, when a specimen seven inches long was sent to the Elgin Museum. On the 6th March, 1842, one was found alive on the beach at Brighton, and considered such a rare acquisition that it was sent for her Majesty's acceptance, when H.R.H. the Prince Consort was the first who recognised and correctly identified the fish as *Capros aper*.

One was taken at Falmouth in 1841; while, on August 12th, 1843, the shore on the western side of Plymouth was strewn with numbers captured by trawlers, who threw them overboard when turning out their nets. A strong easterly wind is said to have been blowing, and which was surmised to have driven them inshore. Mr. Gatcombe, writing in 'The Zoologist,' observes:—"I should say there were more than a thousand of them, and almost all of the most beautiful colours, some quite crimson, others more scarlet or pink, but all more or less beautifully banded or striped. I found, however, that these bands soon faded or disappeared altogether on being exposed to the light and air." The fishermen stated that within a few years these fish have swarmed to such an extent as to have become a perfect pest, and that in many instances the trawlers have actually been obliged to change their fishing-ground in order to be out of their way. Such immense numbers often got into the trawl that holes had to be cut in the net to allow the fish to escape, as it was found almost impossible to lift such a great bulk on board without carrying away their gear.

In July, 1844, about two hundred were taken in a trawl off Runnelstone, and others continued to be captured for three months in the neighbourhood, and along the coast near Land's End, a tract not much visited by the Mount's Bay fishing boats. In 1845 more were taken in the same locality; one at Falmouth in June, 1846; another at Bridgwater in May, 1850, which proved to be full of spawn; and many other solitary instances were subsequently recorded. In March, 1868, an immature example was washed ashore in White-sand Bay, Land's End, having a well-defined black spot at the upper part of the base of the caudal fin.

Since then I find the following instances recorded in 'The Zoologist':—One from the Scilly Isles in 1870; one from Torcross in 1875; a shoal of fifteen taken on the south-west coast of Cornwall, and exhibited in the Crystal Palace Aquarium. In 1879 a number were washed ashore on the Dorsetshire coast, on the sand-banks at Poole, during the night of March 30th; some of them contained spawn, while Mr. Penney considered that as food they were delicious, their flesh possessing a creamy whiteness and a delicate flavour. In April of the same year two were recorded from Exmouth; two in February from Torquay; in May one was picked up on the beach at Eastbourne, and another brought alive into Grimsby from the mouth of the Humber.

Mr. Dunn, of Mevagissey, in some interesting remarks upon the fishes of that locality, written in October, 1878, observes:—"Common here from the Start to the Lizard; these past five years they seem to be on the increase; thousands are yearly caught by Plymouth trawlers off Deadman headland, and thousands more are brought to land by our drift fishermen. In June and July last year I had over one hundred and fifty alive in my tanks at one time."

Last year Mr. Carrington recorded the capture of the Boar-fish from various parts of the south and south-east coast of England during the month of June. The localities noted were Weymouth, Bournemouth, Sheerness, Harwich, and Southend-on-Sea. This fish has also been captured in Scotland, as already observed. Edward also informs us of another example having been taken near Covie, in Banffshire, in August, 1862; while, in Ireland, Andrews obtained it in 1858 off Ventry Harbour.

This fish, the appearance of which in Britain was first noticed

in 1825, is now in abundance in limited tracts, while wanderers occasionally are taken around our coasts. It is remarkable that it may be banded or plain, and it has been suggested that this is due to having been in a dark locality. Space will not permit me at present to enter upon these questions, but I wish to draw attention to the specimens, as I trust others will examine them, and perhaps furnish your readers with their opinions on the changes of colour that take place, and the mode in which this is effected.

With regard to the Turbot, Mr. Jackson in 'Land and Water' for June 27th, has furnished some interesting remarks respecting the rapidity of growth in this species while resident in the tanks of the Southport Aquarium. Such observations demonstrate what may occur under certain conditions, but hardly militate against a different result under other circumstances. The size of a fish may increase in some situations at a more rapid rate than in others, and the dissimilarity in the growth of Turbots kept in the Southport Aquarium and of those in Ballinskelligs Bay, in Ireland, may be an instance in point.

That the conditions of fish-life in an aquarium are unnatural all must admit; the temperature of the water is not subject to such variations as occur in the open air, and this may be more conducive to the rapid growth of some forms than were they committed to the sea. Irrespective of this, food in the former situation is invariably plentiful while the proximity of dangerous foes is kept down to a minimum. It is stated that these captive fishes did not spawn, leading likewise to the supposition that their surroundings were not conducive to the natural continuation of the species. Some little Turbot, measuring about three inches across, were obtained from shrimpers, and placed in the Southport Aquarium. In two and a half years' time they attained to ten pounds each in weight; after two years more they further augmented to twenty pounds, or a yearly average increment of about four and a half pounds a fish.

If we turn to Lord Ducie's interesting investigations in Ballinskelligs Bay we perceive another result, as perhaps might be anticipated, due to all the surroundings being so different from what exist in the Southport Aquarium. Fishing annually in the same locality, Lord Ducie found that the yearly augmentation in the size of young Turbot appeared to have averaged one

pound, or rather less, each fish. That such a deduction may be fairly drawn from an analysis of the tables published in the 'Proceedings of the Zoological Society of London' for December, 1879, appears scarcely to admit of a doubt. Whether the Turbot had merely spawned in that locality for one season—whether they ceased breeding there for a few years—or whatever the cause may have been, a single brood, almost exclusively, appears to have been annually fallen in with at the same place, while the yearly increment in the size of the fish was, as stated, about one pound each.

The foregoing two sets of observations, giving such diverse conclusions, are exceedingly interesting, and I propose offering a few very brief remarks towards explaining how it appears to me that such different results were arrived at. Leaving out of consideration local circumstances, or an individual tendency in a fish to be larger or smaller than its relatives, every investigator must frequently have had his attention directed to how certain forms in particular districts attain to their largest proportions; likewise how—except perhaps in instances of occasional wanderers—on reaching near to the outer bounds of their geographical range, there may be observed a tendency to deterioration, or taking on a smaller size and inferior character. The fish has attained the limit of that region wherein it can reside with benefit to itself, and now it has to give place to another species more adapted to the locality.

This brings us to a consideration of what is the geographical distribution of the Turbot. Is it a fish restricted to the cold north, or does its range extend to the more temperate and genial south? It frequents the seas of Europe, extending southwards into the Mediterranean and the Adriatic. Low considered it rare in the Orkneys, while Yarrell remarked that its numbers increase on coming southwards. Plentiful in the German Ocean, it is not so common along the shores of Ireland, although taken all round the coast. In Holland the fishery begins, about the end of March, a few leagues to the south of Schevelingen; but as the warm weather approaches, the fish gradually advance northward, and fishing continues until the middle of August, when it terminates for the year.

It would seem probable that the Turbot, which extends its range as far south as the Mediterranean, and in the earlier months

of the year migrates northwards, would be more likely to grow with rapidity in an aquarium, living in luxury, having no occasion to employ much muscular exertion, enjoying a comparatively equable climate, and guarded from its foes, than would be the case were it a resident of the Irish Sea. This I would suggest explains how it occurred that such different results were arrived at by two equally accurate observers working in separate localities wherein the conditions of fish-life were totally diverse.

A GERMAN VIEW OF THE FAUNA OF IRELAND.

BY ERNST FRIEDEL.

(Concluded from p. 353.)

III. THE COAST.

The Lakes of Killarney and the tour by Macgillycuddy's Reeks to the Island of Valentia (famous as the first European starting-point of the transatlantic cable) offer to the travelling naturalist many an interesting glimpse of Irish animal-life along the south-west coast. At Killarney the lively imagination of the Irishman sees in the Islands (curiously shaped and twisted by erosion) all kinds of animal forms, which are then connected with the legendary hero-king, O'Donaghue—O'Donaghue's horse, his hen, his cow, &c. One island in the largest lake, Lough Leane, is called Rabbit Island, from its rabbits; another, on which, according to the guide, white mice may be found (!), goes by the name of Mouse Island. The profusion of plant-life which surrounds Lough Leane is astonishing; conspicuous amongst the flora is the great furze, *Ulex europæus*, which grows like a tree along the shore, forming perfect forests. The lakes are rich in fish, including numbers of Salmon and Trout, and permission to fish may be obtained for a small sum. But here again we must remember O'Donaghue; suddenly through the warm spring or summer night he rises from the waters, and the hoof of his white charger tramples the still lake into raging billows. Thus we find the Celts, like Germans, comparing the white-crested waves to the fluttering mane of a noble charger.*

* The more prosaic Frisians call the play of the waves "the calves-dance,"—meaning by "calves" the seals and dolphins.

The neighbourhood is celebrated for its Eagles. One nest, protected by an overhanging rock, has hitherto been inaccessible; but half-a-dozen other nests are plundered pretty regularly, in spite of danger to life and limb.* This takes place between the 15th June and the 1st July, when the little ones are large enough to feed themselves and to be sold to Englishmen, who will give five pounds or more for them. While I sat in my boat beneath the "Eagles' Rock" the old ones were flying backwards and forwards over it; at such times the poor people who let themselves down to the nests from above (and always carry firearms) hang, in danger of death, not daring to touch the young birds until the parents shall have gone; which they finally do, departing at a regular time in search of food—a mountain hare, a kid, or a young lamb. Kohl relates the following:—"We had a keeper with us who assured us he had joined in this Eagle-catching for the last twenty years; during that time the same pair of Eagles had always built there; the difference between them was easily distinguished, and had a new pair taken possession of the nest it would have been discovered at once, as they were watched far and near all through the year. This pair was thought to be the oldest in the neighbourhood, for the feathers of both birds were very faded. After their young ones had been taken from them they would fly round the nest for days, crying day and night, and apparently seeking their young. The keeper said it sometimes happened that one of the captive Eagles regained its liberty and returned to the mountains; but these tame Eagles were always attacked and killed by their wild relations. From one to two young birds are found in the nest; the affection of the Eagle for its young is the more striking when compared with the manner in which other birds will forsake their broods on the slightest disturbance."

The Goats of this region remain out, running wild on the mountains, all through the year; some are killed over precipices, or climb beyond possibility of return, while many become the prey of the Fox and the Eagle.

* In regard to the number of Eagles' nests at Killarney, we think the author must have been misinformed. The guides cannot be depended upon for information of this kind. Ten years ago, when visiting Killarney, we could not discover more than one pair of Eagles in the district, and, considering the persecution which attends all the birds of prey, it is hardly likely that the number of Eagles has increased much in such an oft-visited locality.—Ed.

On the coasts north of Connemara the little short-horned cattle of the country are driven into the mountains, but only stay there during the summer season. Even at the present day the cow plays an important part in the dowry of a daughter of the country, representing coin to a certain extent, as with the ancient Romans, whose money, *pecunia*, was derived from *pecus*, cattle. The Red-deer is still found among the mountains round Killarney and in the wild parts of Connaught, such as Erris and Connemara, though it is certainly disappearing from Ireland. Such Irish Stags as I saw were little weak animals; the Irish Wild Boar is also said to have decreased in size.* I know of no other reason for this degeneration than the breeding in-and-in within the restricted area of an island, and the selection for slaughter of the largest and finest animals. If the remaining representatives of the Irish *Cervus elephas* are not resuscitated by the importation of new blood, their race will die out, sooner or later, without the assistance of the bullet. Climbing Mangerton Mountain, I was offered a piece of an antler as a great curiosity, the enormous price demanded for it being some indication of the animal's rarity, even at Killarney. Ireland was formerly celebrated for its fine Red-deer. Venerable Bede, who died in the year 735, refers to Ireland (Eccles. Hist. lib. 1, cap. 1) as "*Insulam cervorum venatu insignem*." According to Payne ('Brief Description of Ireland,' 1589), there might be bought there, "a fat pigge, one pound of butter, or two gallons of new milk for a penny; a reade-deare without the skinne for 2s. 6d.; a fat beefe for 13s. 4d.; a fat mutton for 18d." Camden also, in his 'Britannia,' states that the County Mayo was rich in cattle, red-deer, hawks, and honey; and that the mountains about Lough Esk (Donegal) were overrun with deer. Nor was the race degenerated in the Bronze Age, as proved by the giant Red-deer (not *Cervus megaceros*) found in the bogs, especially around the lake-dwellings in Ballinderry Lake, County Westmeath; at that time too frequent breeding in-and-in was evidently not prevalent.

In Scotland, deer are also becoming scarcer, and diminishing in size. From England they have almost entirely disappeared; at present they are only found in a wild state in Martindale,

* The author writes under the impression that the wild boar still exists in Ireland, but it has long been extinct throughout the British Islands.—ED.

on the west side of Ulleswater.* The deer of the Hebrides are even smaller than those of Scotland. In Sweden, the Red-deer is rare, and not so large as in North Germany. The stag of Norway is smaller again than his Scandinavian brother. The stags of Corsica and Sardinia are also described as of diminutive size.

O'Flaherty, in his 'History of H'Iar-Connaught,' 1684 (p. 121), writes:—"Next Mam-en are the mountains of Corcoga, on the confines of Ballynahynsy, Rosse, and Moycullin countreys, where the fat deere is frequently hunted; whereof no high mountain in the barony of Ballynahynsy, or half barony of Ross, is destitute." In old chronicles, the Irish stag is described as "very large, fleet, and fierce." Dr. Thos. Molyneux, a friend of O'Flaherty, remarked, in a paper on the large antlers frequently found buried in Ireland, that, in his day, the Red-deer was becoming scarcer than had ever yet been known, and expressed the opinion that unless care were taken, its extinction was to be feared. He alludes to a certain plague or epidemic which had decimated the Reindeer in Lapland. Hardiman, the editor of O'Flaherty's work, suggests (1846) that similar epidemics may also have diminished the Irish deer, and mentions an old man still living who had seen Red-deer abounding in the Barony of Ross, in H'Iar-Connaught, in his younger days; they grazed with the black cattle on the mountains. One stag had so entangled his antlers in a thicket that, being held a prisoner, he perished there. The mountains which for two miles border the lakes of Killarney, under the name of Gléna, are now their chief resort. Here a stag is often driven into the water, and captured and bound with great rejoicing; after which he is brought out in triumph, marked with a particular sign, and once more set at liberty, to the delight of the assembled multitude.

* * * * *

In Irish legends the Doe, and especially the White Doe, plays the same favoured, almost sacred, part that she does amongst Teutonic races. An equivalent for the lost Red-deer of Ireland is now being sought in the more tractable Fallow-deer, which there becomes a tame and park-loving animal; and the flesh of

* Can any correspondent inform us whether the Red-deer is still found in Martindale Forest, and if so in what numbers? The author has omitted to mention the Red-deer of Devon and Somerset.—Ed.

which, to us Germans, has a softer and less gamey flavour. Thompson possessed an antler of the Fallow-deer which had been found deep in a peat-bog near Glenravel, Co. Antrim; he does not, however, venture to conclude from this that the Fallow-deer had ever been a native of Ireland, but speaks rather of Greece, where it still occurs in a wild state. Blasius considers that the countries bordering the Mediterranean may be regarded as the original home of *Cervus dama*. According to Bonaparte, it still abounds in Sardinia and Spain. Cuvier received a wild Fallow-deer from the forests south of Tunis. Belon found it on the Greek Islands.*

Cervus dama may be seen in the parks of Ireland in herds of three hundred or more; the sick and wounded, as has often been remarked, are driven away and killed by the stronger stags. Damp winters often cause great mortality.

An antler of the Moose, *Cervus alces*, has been found in the peat near Stewartstown, Co. Tyrone, a discovery all the more remarkable from the entire absence of any historical notice of the existence of this animal in either England or Scotland.†

The Roe, which still exists in England and Scotland, is absent from Ireland, nor have I heard of any fossil or subfossil remains of *Cervus capreolus* being discovered there.

To continue the list of terrestrial mammals, no trace of the Beaver has yet appeared in Ireland, in spite of the abundance of inland waters. It was formerly hunted on the banks of the Teivi, in Cardiganshire, for the sake of its fur, but became extinct between A.D. 1100 and 1200.

* The following, from Kloden's 'Fossils of Mark Brandenburg' (Berlin, 1834, p. 83), is worthy of notice:—"I am well aware that the Fallow-deer is not generally regarded as indigenous to Germany, and that it is said to have been first introduced into Brandenburg by the Elector Frederick William the Great. It does not, however, follow that it might not have existed there at a much earlier date; fossil remains being found on the Somme, as well as in Sweden and some parts of Germany, without taking into account the bone-heaps of Cette, Antibes, &c., in which Fallow-deer's bones frequently occur. I have in my possession a large and well-preserved portion of an antler from the neighbourhood of Potsdam, that has evidently lain long in the ground. It was not found in peat, but in a layer of loam or marl."

† Prof. Boyd Dawkins ('Cave Hunting,' p. 137) writes:—"The Moose (*Cervus alces*) and the Reindeer are far more abundant in the north than in the south of Britain; their remains have been discovered in the neighbourhood of London, those of both animals at Walthamstow, and those of the latter at Crossness, in Kent, on the banks of the Thames."

Subfossil remains of the Brown Bear have been found in Ireland, but I have been unable to discover any historical notice of the former existence of this species. In 1859 remains of *Ursus arctos*, *Ursus spelæus*, of the Wild Horse, Reindeer, and Mammoth were discovered by Mr. Brenan in a cave at Shandon, near Dungarvon, Waterford. (Journ. Royal Dublin Soc. ii., pp. 344—352; and Journ. Geol. Soc. Dublin, x. p. 147). The Mammoth has also been found in Ireland, at Whitechurch, near Dungarvon, and at Maghery, near Belturbet; the Wild Horse in many places. As for cattle, *Bos taurus*, Linn., has been frequently found.* In the Proceedings of the Royal Irish Acad., Jan., 1839, a race of cattle from the peat is characterised by the convexity of the forehead and its great length, and the shortness and downward inclination of the horns. I should imagine the animal to be *Bos longifrons*, from which are descended the old Celtic cattle of the Welsh and Scotch mountains, and the old dark-coloured cattle of Ireland. The larger breed,† now represented by the Chillingham oxen and descended from the large *Bos urus*, appeared in England at the time of the Anglo-Saxon invasion (5th century), and supplanted the British-Welsh or Romano-Celtic *Longifrons*, but has not been discovered in Ireland. The Irish caves and bogs, however, have never been thoroughly explored, nor have their osteological contents been by any means exhausted.

While ascending Mangerton Mountain, near Killarney, I had the pleasure of observing, for the first time, the Irish Hare alive. I made the ascent on the 10th of June, 1874, accompanied by John O'Donaghue, a guide well known to Killarney tourists under the name of "Happy Jack," who may be recommended especially to German zoologists. He speaks fairly good English, as well as Irish, and knows the resorts of the game, as well as the localities for rare plants. Up to a recent date Mangerton Mountain was looked on as the highest mountain in Ireland, but, according to the latest measurements, Carrantual, which lies on the north-west coast, is higher by 658 feet, the altitude of the former being 2756, of the latter 3414 feet. Four miles above Muckcross we came upon a lake, the Devil's Punchbowl; there are no fish in its icy-cold waters, though I noticed two small

* *Bos longifrons*, Owen.—ED.

† *Bos primigenius*, Bojanus.—ED.

crustacea (*Krebsthier*e). Beyond this the mountain is quite bare, nothing but lichens visible on the rocks. Amongst the highest vegetation we found our old friend the Hare comfortably established, not expecting to be disturbed by visitors in this lonely retreat. On the edge of a rock lay a sheep, torn by an Eagle, a warning to friend Hare, whose flesh the king of the air prefers to that of any other animal. A German eye at once detected the difference in the creature; the ears are shorter than those of our Hare, *Lepus vulgaris*, L. (= *Lepus europæus*, Pallas), the body less rounded, while the conspicuous white tail and red-brown colour of the back [owing to the absence of the black hairs so noticeable in our species] serve still further to distinguish them. When startled these hares did not run like ours, *ventre-à-terre*, but leapt or bounded away, in this respect resembling rabbits. How does Bell, the first to establish *Lepus hibernicus*, characterise it in his 'British Quadrupeds'? We cannot but be struck with the fact that such a remarkable animal should have remained unnoticed by scientific men until so late as the year 1833 (Thompson, vol. iv., p. 19). Jenyns mentions it, in his 'Manual of British Vertebrate Animals,' as a variety of *Lepus timidus*, with the observation that it is almost deserving of place as a separate species. Bell, however, makes the strange observation "It is certainly a very remarkable circumstance that it should have remained unnoticed until so late a period, and can only be accounted for by the fact that it is the only Hare found in Ireland, and that therefore the opportunity of comparison did not frequently occur." I believe the true reason lies chiefly in the native indolence respecting the fauna of the country.†

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My friend, Prof. Ed. v. Martens, writes me as follows from Berlin, Aug. 6th, 1868:—"There is much confusion and disagreement amongst various authorities as to the European kinds of Hare. It is certain that Linnæus did not distinguish so carefully, and described all European Hares as *timidus*. The species which is now found in Sweden, especially in Central Sweden, was

† A passage founded in error owing to a misquotation, probably furnished second-hand, is here omitted as being likely to confuse the reader. It has reference to the condition of the young of the Hare and Rabbit when first born, and the writer of the article, after stating in regard to the Hare what applies to the Rabbit, and *vice versa*, proceeds to argue from these false premises.—ED.

formerly described by Nilsson as *Lepus borealis*; it is characterised by some peculiarities of colour, and is, in the strict sense, the *L. timidus* of Linnæus, while the Central-European (including the German) form is known as *L. europæus*. *L. hibernicus* of Ireland is again different, smaller and darker in colour, resembling *L. variabilis*, but not turning white in winter.*

Some writers consider *Lepus borealis-timidus*, Linn., and *Lepus hibernicus* as varieties of *L. variabilis*, Pallas, which latter species would then include the northern forms and the Alpine Hare. Professor Peters, in working out the mammals of the German North-Polar Expedition, has pointed out that *L. glacialis* of Greenland differs in the form of the skull from all European Hares. In cold winters the Irish Hare becomes lighter coloured, sometimes turning quite white. In the Belfast Museum is an almost snow-white specimen, whiter even than the Alpine Hare; but it must be borne in mind that this may be only an accidental albino specimen. The number of young of the Irish Hare is usually three. It swims well, and will cross the water, even entering the sea, in search of a better feeding place. Many attempts have been made to introduce *Lepus vulgaris* into Ireland, but up to the present time unsuccessfully;† this may possibly be owing to the quarrelsome nature of the native Hares, although the latter are the weaker of the two. On the whole, *Lepus hibernicus* appears to be the North-European Hare that came in the post-glacial period, but which, owing to the separation of the island from the mainland and the change in climate, has gradually formed a remarkably constant variety.‡

To study the Irish sea-birds and the rich fauna of the Atlantic, there is no better place than Galway and the seaside villages in Galway Bay, with the neighbouring Isle of Arran. Here we find an original unmixed population usually speaking Irish, and here we may study their peculiar customs, their widespread superstitions regarding animals, and original views of animal life and culture, which are so primitive that we ask involuntarily if this can still be civilized Europe.

Innumerable flocks of Gulls and other sea and shore birds breed on the islands and on the coast; their eggs are regularly taken, and their flesh is eaten on fast-days, the church reckoning

* This is a mistake, for both pied and white hares are well known in Ireland.—ED.

† We should be obliged for statistics on this point.—ED.

‡ But it is identical with the Scotch Hare.—ED.

these creatures amongst "sea-food." The Common Seal (*Phoca vitulina*), and the Grey Seal (*Halichærus gryphus*) are shot, or killed with cudgels. There are endless legends relating to these animals. One family, the Macnamaras, are said to be descended from a "Cu-mara" (= Seal). Salmon and Trout are still caught abundantly, though not quite in such numbers as formerly. In a holy well near an ancient ruined church there is a sacred Trout which the sick people come to visit. If they find it swimming upon its back they will die; if not, recovery follows. Another spring contains two of these sacred Trout, of which it is said that a heretic soldier intending to cook them, they sprang out of the gridiron and jumped back into the water. From that time, so the legend says, they have borne traces of the hot iron on their backs! Maurice O'Connor, the Irish Orpheus, is said to have made not only fishes and crabs, but even snails and mussels dance after his music.

In concluding these remarks I need only observe that my object will have been attained should they serve to induce other German naturalists to study, in Ireland, a country, a people, and a fauna so well worthy of their attention.

OCCASIONAL NOTES.

THE FERRET AND THE POLECAT.—It is, I believe, generally admitted now that the Ferret is nothing more than a domestic variety of the Polecat; yet, with the exception of the late Dr. Gray (Proc. Zool. Soc. 1865, p. 110), all the writers, from Buffon downwards, whose books I have had an opportunity of consulting, make the two specifically distinct. Cuvier allowed that the Ferret was perhaps only a variety. Bewick and Bingley both mention a cross-breed between the two animals as an every-day fact that required no proof. Bell (Brit. Quad., 1st ed., p. 162) says of this that he "can obtain no authentic verification," and in the second edition, p. 207, "they are said to breed freely with one another." My friend Mr. J. S. B. Borough has bred several litters between a wild-caught male Polecat and a female Ferret, the latter being, I believe in each instance, of the brown or Polecat variety. He has further bred between the Polecat male and hybrid female. I use the word "hybrid" for convenience sake, but if the Ferret and Polecat are specifically identical the term would not, I suppose, be strictly correct. I have this year, from animals bred and given by him, bred between a hybrid male and three-fourths Polecat female—*i.e.* the

offspring of a male Polecat and female hybrid. The female animal in question has a coat which is, I think, undistinguishable from that of a pure Polecat, the hybrid specimens being a little lighter and yellower than she is, though far darker than the comparatively speaking yellow and rusty-looking "Polecat-ferrets." The contrast between the black and white on the face is as well marked as in a pure Polecat; her nose is, however, sharp and the tail tapering like an ordinary Ferret's. She is a small animal—*i. e.*, would be considered rather small for a Ferret. After a gestation of six weeks she produced (May 22nd) five young, one of which opened its eyes when four weeks old, the last of the litter being six days later. This period of gestation agrees with that of Ferrets, and would appear from Lilljeborg (who quotes Nilsson and Melchior), Blasius, and Giebel, to differ from that of the Polecat, which is stated by them to be two months or nine weeks. Four of my young ones are a shade lighter colour than the remaining one, which appears to be exactly of the colour and markings of a Polecat, and while the four are up to the present time tolerably well behaved, the latter has already developed the true temper of a Polecat. I believe Mr. Borough has worked some of his hybrids, but those which I have cannot be worked. My hybrid males breed freely with common Ferrets.—ALFRED HENEAGE COCKS (Great Marlow, Bucks).

RED-LEGGED PARTRIDGE IN GUERNSEY.—In reference to the note on the Red-legged Partridge in Guernsey in the June number of 'The Zoologist' (p. 257), I write a line to say that I omitted this bird from my 'Birds of Guernsey,' as I always considered both it and the common Grey Partridge introduced birds in the Channel Islands, especially within my district; and that I believe the Red-leg, even as an introduced species, is quite extinct in Guernsey, though I understand a few still exist in Jersey, at all events as occasional visitants from the French coast. I am well aware that in Guernsey the Red-leg was frequently called the "Guernsey Partridge," and I have no doubt it was the Partridge of the Guernsey market; and probably in olden times, when a considerable amount of game was preserved both in Guernsey and Herm, it may have been the Partridge of those islands, though it is difficult to say which was the Partridge alluded to in the passages I quote below. I do not think the Red-leg exists at present even as an inmate of Mr. Maxwell's preserve in Herm—he only preserving, as far as I remember, Pheasants and Grey Partridges. If the Red-leg ever visits any of the islands included in the 'Birds of Guernsey' as a straggler it would no doubt be Alderney, the nearest to the French coast; but I have never seen one there, nor did any of the shooters there tell me of their having shot any. As to the existence of Partridges and Pheasants, as well as other game and fish, in Guernsey and Herm, it may be interesting to quote the following passage from the instructions given by George Lord

Carew, of Clapton, Master of the Ordnance within the Realm of England, Governor and Captain-General of the Isles of Guernsey, Alderney, and Sark, to Amias de Carteret, Esquire, Bailiff of Guernsey, his Lieutenant-Governor, dated at Castle Cornet, the 9th day of August, 1610:—

“I do pray you to oversee the keeper of the island of Erme (Herm) that no wilful or negligent waste be made of the Deer, Pheasants, or Conies there. And of the Deer and Pheasants, in your discretion, kill what you please, being confident you will endeavour their preservation and increase as much as myself. For the provision of your table I do give you out of Erme (for so long as you are my lieutenant) after the rate of 200 couples of conies per annum. I do likewise give you, for the provision of your own table, Carps without any certain limitation, praying you to favour the pond, as that the increase be not decayed. I do also desire you to be careful that the breed of Swans brought to the island by Sir Thomas Leighton, and cherished by him, may not be destroyed. Of these yearly you may take for your own use as many as you please, and unto John de Quetteville what you may spare I pray you to bestow upon him; your moderation in both I am sure will be such as the game will be maintained. My predecessors, the Governors, have ever accustomed to be careful that none in the country should keep Greyhounds to destroy the Hares, nor shoot at fowl, without their license, which laudable custom I pray you observe, wherein I do not wish to restrain any man of quality, but the baser people whose time spent in labour is their proper calling. And in like manner not to permit any man to take Partridges, of which game the island is almost destitute.”

In a note to this, the author of the ‘Chronicles of Castle Cornet,’ from which I have copied the above, says:—“Deer, Pheasants, Swans, and Partridges have long since disappeared from Guernsey and Herm. Hares have been reintroduced into Guernsey within a few years, but they were soon destroyed.” From this note it would appear that Mr. Ferdinand Brock Tupper, the author of the above-mentioned ‘Chronicles,’ agrees very much with me, and considers Deer, Hares, Pheasants, Swans, and Partridges as all being introduced species, and having since become extinct; but he does not state whether the Partridges mentioned were the so-called “Guernsey Partridge,” *i.e.*, the Red-leg, or the common Grey Partridge. As I am writing on the Channel Islands, it may be interesting to add, as to the Carp mentioned above, that Heyling, in his account of Guernsey as it appeared in 1629, says, amongst other things:—“A lake on the north-west part of it near unto the sea of about a mile or more in compasse, exceeding well stored with Carps, the best that mortal eye beheld for taste and bignesse.” This island is now nearly dry, especially in summer; but there are still a good many pools of water there, and some large reed-beds, the home of the Reed Warbler. Further on, in the ‘Chronicles,’ Mr. Tupper describes the island of Herm in these words:—“Herm was long kept as a game

preserve for the Governors, who had also the exclusive right of shooting in the Clos du Valle. Thus on the 8th of September, 1716, we find the Royal Court authorizing the King's receiver, Mr. Peter Martin, to hold an inquest for the purpose of discovering the persons who had killed Stags, Roebucks, and Pheasants on the island of Herm, and also who had been sporting in the Clos du Valle, contrary to the ordinance. We have often heard from an old gentleman, now deceased, who remembered when the two last deer on Herm were killed, about the year 1773, that the stags were in the habit of swimming from thence to the Vale, a distance of rather less than two miles at low water, to feed, and then returning, always taking the proper tide each way. In the year 1737 the islands of Herm, Jethou, and Lihou, with the pond of the Grande Mare, near Vazon Bay, now marshy ground, which pond contained the wonderful Carp described by Heylin, were leased to individuals in perpetuity; but while the Governors resided at Castle Cornet they were enabled to diversify the scenes of their lonely residence by an occasional excursion to Herm to shoot Deer, Pheasants, or Rabbits; or to fish at the Grande Mare; or to shoot over the Clos du Valle, Guernsey, containing a great many Hares at that period and long afterwards." I have often been shown the place the deer used to swim over from the Vale to Herm and back. A wild Devon or Somerset stag would think nothing of the distance, even at high water, but the very hot tides might bother him a little at times.—CECIL SMITH (Bishop's Lydeard, Taunton).

THE COLOUR OF CUCKOOS' EGGS.—May I be allowed to call the attention of all who were interested in the controversy "On the colouring of Cuckoos' eggs"—which occurred in the pages of 'The Zoologist' and other Natural-History publications, more especially in the years 1868 and 1873—to the valuable testimony given on this subject in the August number (p. 362) by Mr. Seebohm? It was asserted by those who were opposed to Dr. Baldamus's theory that nobody had ever seen a Cuckoo's egg bearing the least approach to the blue eggs of the Hedgesparrow and Redstart (Zool. S.S. p. 3529, &c.). Mr. Rowley, who examined the question in the most fair and impartial manner, expressed himself unconvinced, but added, "a blue and a green egg of *C. canorus*, well authenticated, would do much to convert me" (p. 3471); and even Professor Newton (who was inclined from the first to favour the new theory) remarked that the fact which told most against it was that, "so far as he was aware, no one had ever found in the nest of a Hedgesparrow a Cuckoo's egg which is similar to that of the Hedgesparrow" (p. 3473). Some evidence, indeed, there was of blue Cuckoo's eggs, but it was not considered sufficiently definite and authentic. Prof. Newton had himself quoted Salerne as an authority 100 years ago for eggs so coloured (p. 3506). The collections of Dr. Baldamus (pp. 1151, 1154, 1155) and Dr. Rey (p. 3435) professed to contain

such blue eggs. Mr. Cordeaux, in his "Ornithological Notes from Lincolnshire" (p. 1285), mentions an egg which was described to him as "partly resembling that of the Hedgesparrow"; and I was able to adduce the testimony of a gentleman, who assured me he had seen such blue Cuckoo's eggs in the nest of the Hedgesparrow (p. 3516). Still there was wanting the positive testimony of some acknowledged authority as an ornithologist—of one who had personal ocular proof to adduce. My own bird-nesting days are long since over, but for seven long years I have been patiently waiting, trusting that eventually such convincing evidence would be forthcoming. This, I maintain, we now have in the communication of Mr. Seebohm: nothing can be more satisfactory than the evidence he gives, and no one could desire a more unimpeachable witness; indeed I hail the testimony of the author of "Notes on the Birds of the Lower Petchora" ('Ibis,' 1876), and "Contributions to the Ornithology of Siberia" ('Ibis,' 1878), as most satisfactory and conclusive, and leaving nothing on this point to be desired. Moreover, I hail, not only the evidence, but the opinion of Mr. Seebohm on the point, as exactly corroborative of the view I ventured to express in October, 1873 (pp. 3723-3727). Since that last communication of mine to 'The Zoologist' on the subject, the interval which has elapsed has only strengthened my then expressed view, which now almost amounts to a conviction, and which exactly coincides with that now put forth by Mr. Seebohm, who has so much greater pretensions to speak with authority than I have.—ALFRED CHARLES SMITH (Yatesbury Rectory, Calne).

BLUE EGGS OF THE CUCKOO.—As there appears a note on this subject in the last number of 'The Zoologist,' by Mr. Seebohm, may I be allowed to add that in my copy of 'Ornithologie Provençale,' by Polydore Roux, there are two eggs of the grey or common Cuckoo figured, one of which is of the ordinary colour, and the other of an uniform light blue, similar to that of the Hedgesparrow and common Redstart.—JOHN GATCOMBE (55, Durnford Street, Stonehouse, Plymouth).

NOTE ON THE CUCKOO.—Last year a pair of Water Wagtails built in the trellis-work of my garden wall, about five feet from the ground, close to a door where people were constantly passing. A Cuckoo deposited its egg in the nest, which in due time was hatched and reared. We used to see the Cuckoo and Wagtails constantly; they were very amusing to watch. I noted that three weeks was the time that the young Cuckoo was fed by the Wagtails, as by the end of that time they had another brood of their own to attend to. I had noticed that only one Wagtail had been for some time in attendance. Curiously enough, this year precisely the same performance has been gone through. The Wagtails repaired

their old nest, and a Cuckoo deposited its egg in it. Mrs. Kelly saw the old Cuckoo leave the nest just after she had left the egg; and the bird has just been safely reared, and the Wagtails sitting again. No doubt they were the same Wagtails and the same Cuckoo, or possibly the young Cuckoo that was reared last year. I shall not destroy the nest, and shall be anxious to see if the same thing takes place next year.—REGINALD KELLY (Lifton, Devon). [Communicated by Mr. Gatcombe.]

TENACITY OF LIFE IN YOUNG HOUSE MARTINS.—The following curious instance of tenacity of life, which came under his own observation, was recently related to me by my friend Mr. F. Kitton. On the 1st of July, a bricklayer, in cleaning the gutter round Mr. Kitton's house, knocked down a Martin's nest, which fell to the ground with its contents, three very young birds and a nest-egg. The remains of the nest and young birds were swept away with the rubbish from the gutter and thrown into the bin, where they remained till Sunday morning, when the nestlings were heard chirping by Mr. Kitton's children, and taken out. The children then fed them with sopped bread, which they took readily, but died on the following morning. Mr. Kitton estimates that these young birds lived entirely without food and deprived of the warmth of the nest and parent bird for sixty-two hours, and that from the time of their violent ejection from their nest to their death a period of eighty-six hours intervened. Shortly before Mr. Kitton mentioned this incident to me I had been reading Prof. Newton's remarks, in the last part of his new edition of Yarrell's 'British Birds' (p. 352 and foot-note), upon the cause of the death of late broods of Martins, so often found in their deserted nests, and it struck me that if this tenacity of life in the young of these birds is the rule it would account for much that has heretofore been matter of surprise to me. There can be no doubt that Prof. Newton's remarks apply to most of the insectivorous birds; but do the Swallows form an exception to the rule? I never attempted to rear any young birds, but on one occasion the nest of a Blackcap Warbler, which was placed in a climbing rose in my garden and contained young ones, becoming displaced by the wind, I was astonished in how short a time the young ones perished. Now I imagine that most of our insect-feeding birds would be able to obtain a supply of food for their young ones, under fences and from other sheltered localities, on many a day when the *Hirundinidæ*, which take their food on the wing in open spaces, would have the greatest difficulty in securing the supply needful for five hungry mouths. Most of us can call to mind any number of such occasions during the past two summers, when the poor Martins have been seen hawking in the cold and wet, looking sadly uncomfortable and out of place. It must also be borne in mind that the young birds would at this time probably be deprived of the warmth of the parent bird, as it would require the united

efforts of both birds to endeavour to obtain food for the brood. They would thus be without, or scantily supplied with, the two great necessities at that tender age—food and warmth. If, therefore, the young Martin were as tender as the young Blackcap, would it not be in great danger of perishing much more frequently than it even now does in this fickle climate? Even young birds which can endure loss of food and warmth for sixty-two hours must at last succumb to such unnatural conditions; and as the season advances and food grows scarcer, whilst the temperature at the same time is falling lower and lower, it does not appear wonderful that the late broods of Martins should perish; and then, but perhaps not till then, the sorrowing old birds should take their departure to warmer climes, leaving their callow brood dead in the nest. May it not be, therefore, that these birds perish, not because their constitution is more tender than that of other birds, but notwithstanding their powers of endurance being exceptionally great?—THOMAS SOUTHWELL (Norwich).

CALL-NOTE OF THE YOUNG GUILLEMOT AND RAZORBILL.—Will any one kindly inform me if the call-notes of the *young* in these species are distinguishable? I am led to ask the question from a paragraph of the late Dr. Saxby, in his 'Birds of Shetland,' where, writing of the Razorbill, he says:—"The cry of the young bird is very peculiar, something between a chirp and a whistle, but more resembling the latter." At the head of his chapter he also gives "Willock" as the local name of this species in Shetland. It occurs to me that this name is descriptive of the cry of the young bird. The cry of the young Guillemot, as I have heard it at Flamborough (and which is peculiar to the young only) may very well be represented by the same word "willock," and I have heard fishermen use it in imitating the note. Macgillivray, in his 'British Birds' (vol. v. p. 318), gives "Willock" as a local name of the Common Guillemot; and on the east coast in some districts the name seems common to both species. At Flamborough the Guillemot is universally called the "scout,"—"Flamborough scouts,"—the name by which they are known both on the Yorkshire and Lincolnshire coasts. When heard at any distance the cry of the young Guillemot has a certain resemblance to some high notes of the *Merulidæ*, and it may very well be called a clear whistle quickly repeated, having a resemblance to the words "willock—willock." When at Flamborough early in August, I repeatedly heard this peculiar call of the young, both from the cliffs and on the sea; and, in the latter case, captured young downy Guillemots, so as to be certain of the species. Although there were countless numbers of Guillemots along the coast, I did not see a single Razorbill; they appear to have left with their young about the last week in July. I got a good series of eggs, taken there in the spring, and was told they had bred in large numbers. However, on August 6th, not

an old or young bird could be seen on or near the cliffs, so that in this case the whistling must have proceeded from the Guillemot, and I am certain that this was the case. It appears, therefore, from the paragraph from Saxby, as well as the local name common to both, that the cries of the young fledglings are alike. Should this be the case it is rather remarkable, seeing the notes of the old birds in the two species are so very dissimilar.—JOHN CORDEAUX (Great Cotes, Ulceby).

STARLINGS VERSUS SKY LARKS.—Some time since I directed attention to the fact that Sky Larks were diminishing in numbers in this immediate neighbourhood, and I blamed the Starlings for causing this result (Zool. 1878, p. 427). I have seen no reason to change my opinion as then expressed. A few days ago I cut the following from the 'Dumfries Courier':—"It is said that the Lark has within the last two or three years been rapidly disappearing from several districts in Scotland, where it used to be found in great numbers in spring and early summer. Districts in the counties of Perth and Forfar are specially referred to. The disappearance of the Lark is believed to be due to the prodigious increase in the numbers of the Starling, which swarm in droves and plunder the nests." On the 22nd July, in the 'Kirkcudbrightshire Advertiser,' I met with the sub-joined statement relative to the western portion of Kirkcudbrightshire, but which would apply equally well to the eastern side of the county:—"The Lark is unfortunately rapidly vanishing from this district, and I fear the Starling must be credited with the marked scarcity of this our sweetest songster. The habits of the Starling when rearing young lead them to grass-fields, and just to places most affected by the Lark when nesting; and although the writer has never caught the Starling *flagrante delicto*, yet he has more than once come on the nest of a Lark containing broken eggs, and all round Starlings were poking about in a suggestive manner among the grass." I do not mean to say that, in Natural History matters, newspapers are to be taken as reliable informants, but such paragraphs as the above show that the scarcity of Sky Larks, and the connection (real or fancied) of the Starling with their disappearance, is attracting attention. Probably some one resident in the districts named above may communicate the result of his observations to the pages of 'The Zoologist.'—ROBERT SERVICE (Maxwelltown, Dumfries, N.B.)

CROSSBILL BREEDING NEAR YORK.—Although the Crossbill, as a rule, retires to northern latitudes to breed, still there are several instances on record of its remaining to nest in England. Every authentic instance should be recorded, for in consequence of its breeding so early in spring its nest is seldom found. My friend Mr. Widdas found this bird breeding in a fir plantation at Stockton-on-Forest, near York. He and another friend were rambling through the plantation very early in spring, when they saw,

as they thought, a Greenfinch's nest built in a fir tree. Immediately he began to ascend the tree, out flew a Crossbill. The nest, which was built half-way up the tree where a branch joined the trunk, was larger and flatter than that of the Greenfinch. It consisted of a foundation of small twigs, lined with leaves, dried grass, and hair. It contained four eggs, two of which are now in my possession.—WALTER RAINE (Leeds).

NESTING OF MONTAGU'S HARRIER.—The nest described by Mr. Raine (p. 362) is formed of very different materials from the one found on our downs by Mr. Howard Saunders in May, 1875, and which was described in a note on the habits and change of plumage of one of the young I had in confinement for six or seven weeks (Zool. 4672). Mr. Raine says that the nest, according to his informant, Mr. Widdas, was "two feet above the ground," whereas the nest found here was on the ground. It was, he remarks, "composed chiefly of rushes and other aquatic plants"; other materials used were cow-hair, moss, grass, &c. Now, with the exception of grass, the nest discovered here had none of these materials, being chiefly built of fern-stalks and heath. The egg is said to differ slightly from others in Mr. Raine's collection, which leads me to think and suggest that possibly the nest found by Mr. Raine's informant in 1875 may have been that of the Common Harrier, whose nest Macgillivray says is raised "a little from the ground"; and, according to Morris, the nest of the Hen Harrier "is of considerable height, sometimes as much as a foot and a half," and is composed of sticks, sedge, reeds, flags, &c. Though Mr. Raine's new specimen differs slightly from other eggs in his collection, he does not say whether it is in size, shape, colour, or texture.—HENRY HADFIELD (Ventnor, Isle of Wight).

GOLDEN-EYE DUCK AND GREEN SANDPIPER IN NORFOLK IN JULY.—On July 31st I bought an old female Golden-eye Duck in Norwich fish-market. The poor thing had been undoubtedly killed in Norfolk, though the salesman could not tell me where. As is well known, the presence of such birds in the summer is not always an indication that they are breeding. Every Norfolk naturalist must have seen the Green Sandpiper occasionally in July, yet the fact of their breeding has never been proved, though often suspected. During the greater part of the present summer a pair have frequented a pool at Cawston, but their nest, though searched for, has not been found, and my own conviction is that they have not bred there.—J. H. GURNEY, JUN. (Northrepps, Norwich).

HAWFINCH BREEDING NEAR LEEDS.—I have to record the discovery of a nest of the Hawfinch, *Coccothraustes vulgaris*, between Coble Hall and Roundhay, during the spring of 1878. It was placed high up in a holly tree, and reminded one of the Ring Dove's flat platform of a nest, consisting of a foundation of small sticks and twigs, lined with roots, hay, &c. It

contained five eggs, easily identified as those of the Hawfinch. This is the only instance known to me of this species breeding in the neighbourhood. During the same year a female Hawfinch was caught in a garden at Newlay, having gorged itself with berries to such an extent as to prevent its escape. Another specimen was shot last December near Otley.—WALTER RAINE (Leeds).

VARIETY OF THE SPOTTED FLYCATCHER'S EGGS.—In June last I met with a nest of curiously coloured eggs of the Spotted Flycatcher, a notice of which may perhaps be worth recording. The nest was placed upon one of the lateral branches of a pear tree trained against a wall, and when discovered, on June 13th, it contained two eggs. What I believe was the first laid one was of the usual type, but the other was very faintly spotted, and of the same ground colour as the former. The next day a third egg was deposited of a very pale blue, with not the faintest trace of a spot. The next egg laid was of the same colour as the third, and the fifth and last was almost white, and the shell was somewhat constricted near the small end. On June 18th I transferred nest and eggs to my collection. When blowing the eggs I noticed that the first and second had some blood-streaks, and in the third and fourth the yolk had settled down to one side; in the fifth there was apparently nothing but yolk. Does not this singular case point to a rapidly failing vital force of the bird while laying as the cause of the abnormal colouring of the eggs?—ROBERT SERVICE (Maxwelltown, Dumfries, N.B.)

DESFONTAINE'S 'BIRDS OF BARBARY.'—Referring to the notice of the reprint of Desfontaine's *Memoir of the Birds of Barbary* in your last number (p. 376), may I be allowed to state that the entire work, text as well as plates (with the exception of Prof. Newton's introductory remarks), was reproduced by photo-lithography? Its literal accuracy is therefore unimpeachable. I am glad to state that Sir Andrew Smith's 'Birds of South Africa,' which has hitherto been almost inaccessible from the extreme rarity of the 'South African Journal,' in which it was originally published, is printed, and only awaits the completion of the index for delivery. These works, with Tunstall's 'Ornithologia Britannica,' already issued to the subscribers, and A. A. H. Lichtenstein's 'Catalogus rerum naturalium rarissimarum' (Hamburg, 1793), now in progress, will complete the issue of the Willughby Society for 1880.—W. B. TEGETMEIER (Finchley, N.)

TURTLE DOVE BREEDING NEAR YORK.—I have eggs of the Turtle Dove in my collection, which were taken from a nest in a fir plantation at Acomb, near York. Four nests containing eggs were found within a short distance of each other. I think this worthy of record, because, so far as my experience goes, the Turtle Dove's nest is a rarity so far north.—WALTER RAINE (Leeds).

LATE NESTING OF THE NIGHTJAR.—In 'The Field' of July 31st there is a notice of the nest, or rather the eggs, of the Nightjar having been found as late as July 26th. I can give another instance of the late nesting of this species. On July 24th two eggs were found by some children near Westleton, in this county, who put the old bird off; one of them was taken, and, upon being blown, the contents showed that incubation had only very recently begun.—G. T. ROPE (Blaxhall, Suffolk).

[In 'The Field' of August 21st a correspondent states that he found a Nightjar, in Sussex, sitting on two eggs on August 17th.—ED.]

BREEDING OF THE SHOVELLER IN THE STEWARTRY OF KIRKCUDBRIGHT.—Col. Gordon Maitland, of Kenmure, shot two fine young male Shovellers on the island in Loch Ken on August 2nd. There were three or four more of them, evidently a brood that had been hatched somewhere about the head of Loch Ken. This duck, although occasionally met with during winter, has very rarely been known to breed in this country, but of late years several instances have been recorded of its breeding in the northern parts of Britain. Capt. Clark Kennedy has met with the Shoveller breeding on Cally, in June, 1878; and at a late meeting of our local Natural History Society, Mr. Hastings, of English Street, stated that a young female Shoveller had been sent to him in August, 1879, from Kirkmahoe, where it had doubtless been bred. According to Mr. Harvie Brown, the Shoveller and several other species of ducks are showing a tendency to extend their breeding range in a southerly direction. By a due observance of the Protection Acts on the part of sportsmen, we may look for such instances as the above increasing year by year.—ROBERT SERVICE (Maxwelltown, Dumfries, N.B.)

NESTING OF THE NIGHTINGALE IN EAST YORKSHIRE.—We have had a pair of Nightingales here this summer, which have nested with us and brought off the young ones safely. They left us a little more than three weeks ago.—L. H. WEST (Glenrock, Brough, East Yorkshire).

DIPPER RETURNING TO ITS OLD NEST.—On the 17th March last, when trouting on a stream in Welcombe parish, North Devon, I showed a friend an *old* nest of the Dipper, he not having seen a nest of that bird before. This nest I had found the previous season (1879) with young in it. My friend would examine it, though I said, "It is of no use doing that," when all of a sudden, to my surprise, the old bird flew out from under his hand, leaving five eggs, two of which my friend took.—W. JESSE.

GREENLAND FALCON IN THE CO. DONEGAL.—Through the kindness of a correspondent in the County Donegal, I have just received a specimen of the Greenland Falcon, *Falco candicans*, which was taken some time since in his neighbourhood. He states that, as near as he can recollect, it was about

Hallowtide (Nov. 1st), 1877, that it was caught alive by a farmer in a warren on the north-west shore of the entrance of Lough Foyle. It had gorged itself on a rabbit, and allowed itself to be caught without difficulty. It was kept alive for two or three days on raw beef, and then died, when the skin, now before me, was preserved by a bird-fancier, a sergeant of police in the neighbourhood. It is to be regretted that when first captured it did not find its way to some practical falconer, who would doubtless have turned so great a prize to good account.—J. E. HARTING.

COLOUR SENSE IN BIRDS.—In a recent number of 'Nature,' a correspondent of that journal makes the following interesting observations on colour sense in birds:—"I have been lately watching," he says, "with great delight, two Goldfinches building their nest. They placed it nearly at the end of an outside branch of a young sycamore tree, so that there was nothing but sky above it, and the gravel-path below. The window from which I observed them, being never opened, and well covered with flowers in pots and a blind, seems to have caused them no alarm, although not more than two yards distant from them; and their object appears to have been to make their nest invisible from below. To this end they chose their building materials with such skill and such colour-matching power that if one had not seen the nest built it would be quite impossible to discover it; to match the tree they took its long flexible blossoms, and to match the sky the equally long and flexible stalks and flowers of the garden forget-me-not, of which a bed was close at hand in full bloom. I watched them carefully, and, as far as I could see, they used no other materials than these flowers, though I saw one of them attempting to get the dirty-white cotton tie off a budded rose tree. At all events, the nest was mainly built of them. The blue of the forget-me-not has of course faded, but the general effect from below is that of a scarcely visible grey green thickening of one of the bunches of sycamore leaves. They seemed to enjoy flinging their flower-wreaths about. And that leads to the question whether birds—who are in many ways like children—do not often, out of mere playfulness and love of colour, pull to pieces yellow crocuses and other bright flowers."

ALPINE SWIFT IN YORKSHIRE.—On April 17th I saw an Alpine Swift at Scarborough, the first of the Swallow tribe I saw this year. It was about at intervals for a fortnight or so, after which I saw it no more.—L. H. WEST (Glenrock, Brough, East Yorkshire).

WHINCHAT IN CORNWALL.—On August 22nd I saw a Whinchat in our garden. As this is a rare bird in Cornwall, I thought you might like to publish its occurrence in 'The Zoologist.' I am quite sure it was the Whinchat and *not* the Stonechat, as I watched it for some time through a telescope, and clearly saw the white stripe over the eye.—HERBERT P. HART (Polbreen, The Lizard).

ORNITHOLOGICAL NOTES FROM NORFOLK, 1878.—The full title to Mr. Stevenson's communication under this heading in the August number of this Journal (p. 325) should have been "Ornithological Notes from Norfolk for 1878 and 1879."

ON THE PERIOD AND INTERVALS AT WHICH THE COMMON LIZARD CASTS ITS SKIN.—I have long been aware that our Common Lizard, *Zootoca vivipara*, periodically casts its skin; but I have lately discovered, to my surprise, that no mention of this fact is made either in Bell's 'History of British Reptiles' or in 'Our Reptiles,' by M. C. Cooke, the two familiar text-books on the subject. Neither is any information on this point afforded by the excellent 'Manual of British Vertebrate Animals,' by the Rev. L. Jenyns, nor in Lord Clermont's 'Guide to the Quadrupeds and Reptiles of Europe.' Indeed, at the present moment, I can only remember to have met with one allusion to this change of skin in the Lizard, and this, a very brief one, is contained in Fleming's 'History of British Animals.' That author writes as follows (p. 151):—"Colours vary with the condition of the cuticle, which is frequently renewed. Before casting, the colours are brownish black; after they change, dark green and yellow tints prevail." There being, then, such a dearth of information on the subject, I cannot doubt that the following observations, made during the present summer by my friend Miss C. Hopley, will be perused with interest. This lady, who has for some time past been engaged in a special study of the *Reptilia*, writes as follows:—"A small English Lizard, *Zootoca vivipara*, in my possession has cast her coat three times within seven weeks. Her first change was on June 26th, the rough, dingy garment of last year's growth coming off in pieces. Whereas the colouring had been dull and almost undefined, behold the little creature now in a dress of pale sage-green, with stripes of rich dark velvet, her throat creamy white, and the whole under part of a beautiful buff colour, soft, smooth, bright, and shaded like a delicate shell. On July 20th, with no previous indication (except that the new attire was not very tight-fitting—a circumstance attributable to sparseness of diet), this still lovely garment was cast off entire, and reversed—even the sleeves are there. The claw-coverings of the hind legs were detached from the rest, and look like diminutive gloves. Her colour this time might be just a trifle darker above, but still of the same delicate hue, and with very slight indications of spots. On the afternoon of August 15th, and within three-quarters of an hour from the time I had placed the glass cage in the sunshine, I was surprised to find a third cast-off dress, and in a still more perfect condition than the former sloughs, one sleeve being entire to the very tips of the slender fingers. One leg is equally entire and unreversed, showing that she had slipped the limb easily out of it. Another Lizard, *Lacerta agilis*, donned her summer

attire on July 16th, and eighteen days afterwards—*viz.* August 4th—she had another new dress, both the discarded ones being reversed and almost entire. The head-shields do not appear to be renewed at each sloughing, nor are the tail-scales always doffed at the time, but come off in whorls by slow degrees, the tip last. One Green Lizard had a new coat for only his tail early in May—a postponement, no doubt, of the completion of his last year's attire. In each case the sloughing has occurred when the Lizards have been exposed to the full sunshine; and it would be interesting to know if these frequent changes are a sign of health or the contrary, and whether the sloughing is dependent on the temperature and condition of the animal. They all feed poorly, being capricious in their tastes, and not approving their London diet. When, through the benevolence of some suburban friend, a supply of fresh garden insects can be presented to them, on these they pounce with gusto." The most remarkable circumstance in connection with the changes observed is the frequency with which the cuticle is cast; for it would hardly be supposed that the new skin would be in a condition to be again shed in less than a month from the previous casting. Yet such appears to be the fact.—J. E. HARTING.

SPREAD OF DISEASE BY THE AGENCY OF EARTHWORMS.—Recent researches by M. Pasteur appear to throw considerable light on the origin of anthrax, or splenic fever, and allied diseases, which attack cattle, sheep, &c. When an animal dies of anthrax it is not uncommonly buried on the spot. The conditions of putrefaction prove fatal to the small parasitic organism, or *bacteridium*, which is abundant in the blood at death. The gas given off causes it to break up into dead and harmless granulations. But before this can occur not a little of the blood and humours of the body has escaped into the ground about the carcase, and here the parasite is in an aerated medium favourable to the formation of germs. These corpuscular germs M. Pasteur has found in the soil, in a state of latent life, months and years after the carcase was buried, and by inoculation of guinea-pigs with them has produced anthrax and death. Now it is specially notable that such germs have been met with in the earth at the surface above the place of burial, as well as near the body. The question arises, How came they there? And it would appear that earthworms are the agents of conveyance. In the small earth-cylinders of fine particles which these creatures bring to the surface and deposit after the dews of morning or after rain, one finds, besides a host of other germs, the germs of anthrax. The same process was proved also by direct experiment. Worms kept in ground with which *bacteridium* spores had been mixed were killed after a few days, and many of the spores were found in the earth-cylinders in their intestines. The dust of this earth, after the cylinder, having been

disaggregated by rain, gets blown about on the neighbouring plants, and the animals, eating these, thus receive the germs into their system. It is suggested that possibly other diseased germs, not less harmless to worms, but ready to cause disease in the proper animals, may be in like manner conveyed to the surface in cemeteries. This would furnish a fresh argument for cremation. The practical inference as to anthrax is that animals which have died of this should not be buried in fields devoted to crops or pasturage, but wherever possible in sandy, calcareous ground, poor and dry—unsuitable, in a word, for worms.

OBSERVATIONS ON ANTS, BEES AND WASPS.—At a meeting of the Linnean Society, held June 17th last, the following interesting observations were communicated by Sir John Lubbock, under the above title:—A dead blue-bottle fly was pinned down, and after vain efforts at removal the selected ant hied home and emerged with friends, who slowly, and evidently incredulously, followed their guide. The latter, starting off at a great pace, distanced them, and they returned, only, however, to be again informed, come out, and at length be coaxed to the prey. Several experiments made with different species of ants, and under varied circumstances, seem to indicate the possession of something approaching language. It is impossible to doubt that the friends were brought out by the first ant, and, as she returned empty-handed to the nest, the others cannot have been induced to follow merely by observing her proceedings. Hence the conclusion that they possess the power of requesting their friends to come and help them. In other experiments testing the recognition of relations, although the old ants had absolutely never seen the young ones until the moment (some days after arriving at maturity) they were introduced into the nest, yet in all cases they were undoubtedly recognised as belonging to the community. It would seem, therefore, to be established that the recognition of ants is not personal and individual, and that their harmony is not due to the fact that each ant is acquainted with every other member of the community. It would further appear from the facts that they recognise their friends even when intoxicated, and that they know the young born in their own nest, even when they have been brought out of the chrysalis by strangers, that the recognition is not effected by means of any sign or password. With regard to workers breeding, the additional evidence tends to confirm views previously advanced, that when workers lay eggs males are always the issue of these. Without entering into details of instances, it may broadly be affirmed that in the queenless nests males have been produced, and not in a single case has a worker laid eggs which have produced a female, either a queen or a worker. On the contrary, in nests possessing a queen, workers have been abundantly produced. These curious physiological facts lead to the presumption that, as in the case of

bees so also in ants, some special food is required to develop the female embryo into a queen. In Sir John's nests, while from accidents and other causes many ants are lost during the summer months, in winter nevertheless there are few deaths. Specimens of *Formica fusca* and *F. sanguinea*, still lively, are now four, and others five, years old at least. The behaviour to a strange queen often results in her being ruthlessly killed; yet as communities are known to have existed for years, queens must occasionally have been adopted. With the view of trying how far dislike and passion might be assuaged by a formal temporary acquaintance, a queen of *F. fusca* was introduced into a queenless nest, but protected by a wire cage, and after some days the latter was removed, but the queen was at once attacked. Mr. M'Cook nevertheless relates an instance of a fertile queen of *Cremastogaster lincolata* having been adopted by a colony of the same species. Such difference in conduct, Sir John suggests, may be due to his own ants having been living in a republic, for it is affirmed that bees long without a queen are strongly averse to adopting or accepting another. Furthermore, if a few ants from a strange nest are put along with a queen they do not attack her, and if other ants are by degrees added the throne is ultimately secured. In pursuance of experiments to test the sense of direction, some ants were trained to go for their food over a wooden bridge made up of segments. Afterwards, when they had become accustomed to the way, and an ant was in the act of crossing, a segment was suddenly reversed in direction, evidently to the ant's discomfiture; she then either turned round, or, occasionally after traversing the bridge, would return. When, however, similar pieces of wood were placed between nest and food and the ant at the middle piece, those at the ends being transposed, the ant was not disconcerted. In other instances a circular paper disk was placed on a paper bridge, and when the ant was on the disk this was revolved, but the ant turned round with the paper. A hat-box, with holes of entrance and exit pierced at opposite sides, was planted across the line to the food; when the ant had entered and the hat-box reversed, therefore with holes in opposite directions, the ant likewise wheeled about, evidently retaining her sense of direction. Again, with the insect *en route*, when the disk or box with the ant within was merely shifted to the opposite side of the food, without being turned round, the ant did not turn round, but continued in what ought to have been the direction of the food, and evidently was surprised at the result on arriving at the spot where the food had previously been. In opposition to the opinion expressed by M. Dewitz, Sir J. Lubbock regards the ancestral ant as having been aculeate, and that the rudimentary condition of the sting in *Formica* is due to atrophy, perhaps attributable to disuse. A ground plan of the nest of *Lasius niger* is given by Sir John, which exhibits an intricate narrow and winding entrance passage; the main nest-cavity is further supported by pillars, and here and there protected recesses

are formed—evidently strategical retreats in times of danger. Studying the relations and treatment of the Aphides, or plant-lice, by the ants, Sir John clearly demonstrates that not only are the Aphides kept and protected in the ants' nests, but the eggs of *Aphis*, laid outside on the leaf-stalks of its food-plant in October, and exposed to risks of weather, are carefully brought by the ants into their nests, and afterwards tended by them during the long winter months until March, when the young are again brought out and placed on the young vegetable shoots. This proves prudential motives, for though our native ants may not lay up such great supplies of winter stores of food as do some of those found abroad, they thus nevertheless take the means to enable them to procure food during the following summer. The fact of European ants not generally laying up abundant stores may be due to the nature of their food, and these cannot always be kept fresh. They may also not have learned the art of building vessels for their honey, probably because their young are not kept in cells, like those of the honey-bee, and their pupæ do not construct cocoons, like those of the humble-bee. Our English ants, nevertheless, store proportionately to their size; for if the little brown garden ants be watched milking their Aphides, a marked abdominal distension is observable. The paper concludes by a history and technical description of a new species of Australian honey-ant. This corroborates Wesmael's strange account of the Mexican species; certain individual ants are told off as receptacles for food—in short, they become literally animated honey-pots.

NOTICES OF NEW BOOKS.

A Handbook of Deer Stalking. By ALEXANDER MACRAE, late Forester to Lord Henry Bentinck. With an Introduction by HORATIO ROSS. Edinburgh and London: Blackwood and Sons. 1880. Post 8vo, pp. 85.

THE writer of this excellent little manual, who has filled the place of forester for many years in one of the best Highland deer-forests, is evidently a man of great observation, and has improved the opportunities which he has enjoyed of making himself thoroughly acquainted with the habits of Red-deer, and the whole science of stalking them. We have read every word of his book, and like it much. Although written for the use of sportsmen, it contains much to interest naturalists, for in the remarks which are made concerning the keen sense of smell, and the power of vision, possessed by the Red-deer, a considerable insight is afforded into the ways and habits of this noble beast.

The author condemns the practice of driving as "a coarse way of going to work, depending for its success not so much upon knowledge as upon force"; and Mr. Ross, in his Introduction, we are glad to see, thoroughly endorses this opinion. Driving large herds of deer to passes he considers very injurious to a forest, and a most cockney, unsportsmanlike proceeding, reducing the noble sport of deer-stalking to a level with a "battue of pheasants and hares."

When a sportsman of fifty years' experience states, as Mr. Ross does in his Introduction, that this little book is "the very thing that was required," that "every old stalker will read it with delight, and every beginner with advantage," we feel that it is *his* opinion that should be taken, and not that of the reviewer. We abstain, therefore, from offering any criticism, the more so since our experience does not justify us in writing with any show of authority on the subject.

The book is capitally printed on thick paper with a good margin, and illustrated with two excellent photographs of deer, alive and dead.

Of Englishe Dogges, the diversities, the names, the natures, and the properties. A short Treatise written in Latine by JOHANNES CAIUS, of late memorie, Doctor of Phisicke in the Universitie of Cambridge. And newly drawne into Englishe by ABRAHAM FLEMING, Student. Imprinted at London. 1576.

THE original work of Dr. John Kay was published in 8vo in 1570, under the title 'Johannis Caii Britannii de Canibus Britannicis, Liber unus,' and in 1576 an English translation by Abraham Fleming appeared in 4to. This translation, copies of which are extremely rare, has just been reprinted in 8vo for the proprietors of 'The Bazaar' and 'The Exchange and Mart,' 170, Strand.

As the earliest work on dogs in the English language it is a very curious production, and although not reproduced in facsimile, the original being in old English black letter, it is a reprint line for line, and even error for error, the arrangement and general character having been carefully preserved throughout, while the title-page is an exact copy taken by photography from a copy of the work in the British Museum.

In a dedicatory epistle written in Latin in a very pedantic style, and replete with fulsome praise of the Dean of Ely, to whom it was dedicated, the translator informs us that Dr. Kay's work, which he calls "an epitome concerning British dogs," was originally written (several years before it was printed) for the information of Gesner, who was engaged at that time in the preparation of his '*Historia Animalium*,' which was published in 1551. He, Fleming, being, as he says, delighted with the novelty of its appearance, conceived the idea of translating it into English, and this we believe is the only translation extant. Whether it be an accurate one or not (the writer himself terms it "a free interpretation") we need not here enquire. It will suffice if we give a single extract for the benefit of those who may be unacquainted with the work, and who may be curious to judge of its style and the nature of the information imparted.

Treating of the sheep-dog, the translator says:—

"Our shepherdes dogge is not huge vaste and bigge, but of an indifferent stature and growth, because it hath not to deale with the bloudthyrsty wolfe, sythence there be none in England, which happy and fortunate benefite is to be ascribed to the puisaunt Prince *Edgar*, who to th'intent ye whole countrey myght be evacuated and quite clered from wolves, charged and commaunded the welshmen (who were pestered with these butcherly beastes above measure) to paye him yearely tribute which was (note the wisdom of the King) three hundred wolves. Some there be which write that *Ludwall*, Prince of Wales, paide yeerly to King *Edgar* three hundred wolues in the name of an exaction (as we have sayd before). And by the meanes hereof, within the compasse and tearme of foure yeares none of those noysome and pestilent beastes were left in the coastes of England and Wales. This *Edgar* wore the crowne royall, and bare the scepter imperiale of this kingdome about the yeere of our Lorde nyne hundred fifty-nyne. Synce which time we reede that no wolfe hath been scene in England, bred within the bounds and borders of this countrey, mary there have bene divers brought over from beyonde the seas, for greedynesse of gaine and to make money for gasing and gaping, staring and standing to see them, being a straunge beast, rare, and seldom scene in England."

It need scarcely be remarked that the statement to the effect that there have been no native wolves killed in England since Edgar's time is not only opposed to the fact, but there is abundant evidence to show that they existed in this country for several centuries afterwards. See '*The Zoologist*' for 1878, p. 464.

A History of British Birds. By the late WILLIAM YARRELL, V.-P.L.S., F.Z.S. Fourth edition. Revised by ALFRED NEWTON, M.A., F.R.S., Professor of Zoology and Comparative Anatomy in the University of Cambridge. Part XIII. June, 1880. Van Voorst, Paternoster Row.

SINCE our last notice of this work it is satisfactory to be able to announce the appearance of another part (Part xiii.), and, although a longer interval has elapsed between the publication of this and the preceding numbers than could be wished for, we must be thankful for small mercies, and hope, now that the editor has disposed of the troublesome order *Passeres*, more rapid progress will be made towards the completion of the work.

In the number before us the species dealt with are the Pie, Jay, Nutcracker, Swallow, Martin, Sand Martin, Purple Martin, concluding the *Passeres*, and the Swift, Alpine Swift, Nightjar, and a portion of the Cuckoo, as a first instalment of the *Picariæ*.

A noticeable feature in the present part is the very complete account given of the Nutcracker, as compared with the somewhat meagre information supplied in the third edition of the work, more particularly as regards the nidification of this bird, the older accounts of which, as Professor Newton remarks, "have proved to be mere suppositions, and very wide of the mark."

The reliable information which we now possess concerning the breeding of the Nutcracker has been collected from the observations of different naturalists, made for the most part long subsequently to the publication, in 1856, of the third edition of this work. Indeed, since that date so much fresh material has come to hand, not only as regards the nidification but also the geographical distribution of this species, that Professor Newton may be said to have written an entirely new and original account of it.

No less interesting and valuable is the chapter upon the Cuckoo (or, as he prefers to write it, "Cuckow"), which, however, remains incomplete until the appearance of the next part.

Referring to the average date of the arrival of this bird in England, which he considers to be "about the middle of April," he says:—"Its arrival has frequently been reported in March, or earlier still, but such records must be treated with

suspicion, if not incredulity. Mr. Harper says (Zool., p. 3115) that a Cuckow's egg was taken in Norfolk, April 5th, 1851, and (p. 3145) that on the 14th of the same month he saw two, one of which he shot. Mr. Borrer informs the editor that in a series of observations made in Sussex for more than twenty years, April 6th, 1844, was the earliest day on which he noticed the Cuckow's appearance."

A Comparative Catalogue of Birds found in Europe and North America. By PERCY EVANS FREKE. Separately printed from the Scientific Proceedings of the Royal Dublin Society. Read December 15th, 1879.

THROUGH the courtesy of the author, we have received a copy of a Catalogue with this title, which bears evidence of having been compiled with considerable care. Unfortunately the writer has drawn no conclusions of any kind from the statistics which he has collected, and each individual reader is left to ascertain for himself what proportion of North-American species have found their way to Europe; to what particular order of birds these transatlantic visitors chiefly belong; by what line of route they probably travel; and whether their visits are more frequent at one season than another. Upon these and other interesting points we should like to have had some expression of opinion from Mr. Freke, who apparently has been content to act the part only of a gleaner, leaving it to others to thrash out and separate the grain from the husk.

In connection with the subject we may take this opportunity of directing attention to Mr. J. Dalgleish's "List of occurrences of North-American Birds in Europe," of which two parts have appeared in the 'Bulletin of the Nuttall Ornithological Club' for April (pp. 65—74) and July (pp. 141—150). We have not yet found leisure to compare these two lists, but it would doubtless be desirable to do so, as well as Professor Spencer Baird's memoir "On the Distribution and Migrations of North-American Birds" ('Ibis,' 1867, p. 257), before attempting to draw conclusions on any of the points above suggested.

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ADDRESS TO THE BIOLOGICAL SECTION OF THE BRITISH ASSOCIATION.*

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President of the Section.

SIXTEEN years ago, at the meeting of the British Association in Bath, the duty which I am endeavouring to discharge to-day was entrusted to my predecessor and old friend, the late Dr. John Edward Gray. In the address which he then delivered before this section, he spoke on "Museums, their Use and Improvement," and he who had devoted a whole lifetime to the formation and management of one of the greatest zoological collections in the world, was well qualified to give an opinion and advice on this subject. Indeed, when I read now what he then insisted on as a necessary change in the system of Museums, I feel compelled to pay a passing tribute to his memory. Zoology, Geology, Botany were to him not distinct and independent studies; the views advanced by a Lamarck, by a Treviranus,—*viz.*, that our knowledge of these sciences would remain fragmentary and one-sided as long as they were not studied in their mutual relations,—found in him one of the earliest advocates in this country. Against all opposition he tried to unite the Zoological and Palæontological collections in the British Museum, giving up this attempt only after having convinced himself of the impracticability of the scheme; and he readily joined the band of men who demanded that a Museum should be not merely a

* Delivered at Swansea, August, 1880.

repository for the benefit of the professed student and specialist, but serve in an equal measure for the recreation of the whole mass of the people and for their instruction in the principles of Biology. This was the spirit in which he worked, and in the last years of his life he had the satisfaction of being able to say that there was no other collection in existence more accessible and more extensively used than the one under his charge.

I am encouraged to return to-day to the same subject, because I have daily the opportunity of observing that the public more and more comprehend the use of Museums, and that they appreciate any real improvements, however slight. Paragraphs, leaders, articles published in the public journals and periodicals, references made in speeches or addresses, questions put in the Houses of Parliament whenever an opportunity offers—all testify that the progress of Museums is watched with interest. Not long ago a Royal Commission entered deeply and minutely into the subject, and elicited a mass of evidence and information invaluable in itself, though you may differ from some of the conclusions and views expressed in their final report. Biological Science has made rapid strides: not only do we begin to understand better the relations of the varieties of living forms to each other, but the number of varieties themselves that have been made known has also been increased beyond all expectation, and the old repositories have everywhere been found too narrow to house the discoveries of the last forty years. Therefore you find that the United States, Austria, Prussia and Saxony, Denmark and Holland, France and Great Britain have erected, or are building anew, their National Museums, not to mention the numerous smaller museums which are more or less exclusively devoted to some branch of Biological Science.

The purposes for which Museums are formed are threefold: (1) to diffuse instruction among, and offer rational amusement to, the mass of the people; (2) to aid in the elementary study of Biology; and (3) to supply the professed student of Biology or the specialist with as complete materials for his scientific researches as can be obtained, and to preserve for future generations the materials on which those researches have been based. Although every museum has, as it were, a physiognomy of its own, differing from the others in the degree in which it fulfils one or two or all three of those objects, we may divide museums

into three classes, *viz.*: (1) National; (2) Provincial; and (3) Strictly Educational Museums; a mode of division which may give to those of this assembly who are not biologists an idea of what we mean by the term "species." The three kinds pass into each other, and there may be hybrids between them.

The museum of the third class, the Strictly Educational institutions, we find established chiefly in connection with universities, colleges, medical and science schools. Its principal object is to supply the materials for teaching and studying the elements and general outlines of Biology; it supplements, and is the most necessary help for, oral and practical instruction, which always ought to be combined with this kind of museum. The conservation of objects is subservient to their immediate utility and unrestricted accessibility to the student. The collection is best limited to a selection of representatives of the various groups or "types," arranged in strictly systematic order, and associated with preparations of such parts of their organisation as are most characteristic of the group. Collections of this kind I have seen arranged with the greatest ingenuity, furnishing the student with a series of demonstrations which correspond to the plan followed in some elementary text-book. This, however, is not sufficient for practical instruction; besides the exhibited permanent series, a stock of well-preserved specimens should be kept for the express purpose of allowing the student to practise dissection and the method of independent examination; and in this latter I am inclined to include the method of determining to what order, family, genus or species any given object should be referred. By such practice alone can the student learn to understand the relative value of taxonomic characters and acquire the elementary knowledge indispensable for him in the future. Finally, in the educational museum should be formed a series of all the animals and plants which are of economic value, or otherwise of importance to man. The proposal to unite living and extinct forms in one series, which has been urged by eminent men with such excellent reasons, might be tried in the educational museum with great advantage to the student, as the principal objections that are brought forward against this plan being carried out in larger collections, do not apply here.

A museum which offers to the teacher and student the materials mentioned fulfils its object; its formation does not

require either a long time or heavy expense; but the majority of these institutions outgrow in time their original limits in one or the other direction; and if such additions do not interfere with the general arrangement of the museum, they neither destroy its character nor do they add to its value as a strictly educational institution.

The principal aim of a Provincial Museum ought, in my opinion, to be popular instruction. I do not mean that it should be merely a place for mild amusement and recreation; but that it should rank equal with all similar institutions destined to spread knowledge and cultivate taste among the people. To attain this aim it should contain an arranged series of well-preserved specimens, representing as many of the remarkable types of living forms as are obtainable; a series of useful, as well as noxious, plants and animals; of economic products obtained from the animal and vegetable kingdoms; and last, but not least, a complete and accurately named series of the flora and fauna of the neighbourhood. The majority of Provincial Museums with which I am acquainted are far from coming up to this ideal. One of the first principles by which the curator of such a museum should be guided is to admit into his collection no specimen unless it be well mounted and a fair representation of its species. He has not the excuse of his colleague in charge of a large museum, who has to retain those monsters which are literally his *bêtes-noires*, viz., specimens to which a history is attached, and the removal of which would sooner or later be resented by some of his fellow-labourers. The only too frequent presence of such badly-mounted specimens in Provincial Museums is not always the fault of the curator. The slender means with which he is provided are generally insufficient to encourage taxidermists to bestow the necessary amount of skill and time on their work. Besides, taxidermy is an art which depends as much on natural gift as drawing or modelling; and so long as we are obliged to be satisfied with receiving into our collections mediocre specimens, mediocre stuffers will take up taxidermy as a trade without there being one among them who is naturally qualified for it.

The direct benefit of a complete collection of the flora and fauna of the district in which the Provincial Museum is situated, is obvious, and cannot be exaggerated. The pursuit of collecting and studying natural-history objects gives to the persons who are

inclined to devote their leisure hours to it a beneficial training for whatever their real calling in life may be: they acquire a sense of order and method; they develop their gift of observation; they are stimulated to healthy exercise. Nothing encourages them in this pursuit more than a well-named and easily accessible collection in their own native town, upon which they can fall back as a pattern and an aid for their own. This local collection ought to be always arranged and named according to the plan and nomenclature adopted in one of those numerous monographs of the British Fauna and Flora in which this country excels; and I consider its formation in every Provincial Museum to be of higher importance than a collection of foreign objects.

The majority of Provincial Museums contain not only biological collections, but very properly, also, collections of art and literature. It is no part of my task to speak of the latter; but before I proceed to the next part of my address I must say that nothing could more strikingly prove the growing desire of the people for instruction than the erection of the numerous Free Libraries and Museums now spread over the country. The healthier their rivalry the safer their growth will be, especially if they avoid depending on aid from the State, or placing themselves in the hands of a responsible minister; if they remain what they are—municipal institutions, the children and pride of their own province.

However great, however large a country or a nation may be, it can have, in reality, only one National Museum truly deserving of the name. Yours is the British Museum; those of Scotland and Ireland can never reach the same degree of completeness, though there is no one who wishes more heartily than I do that they may approach it as closely as conditions permit. The most prominent events in the recent history of the British Museum (to which I must confine the remainder of my remarks) are well known to the majority of those present:—that the question either of enlarging the present building at Bloomsbury, or of erecting another at South Kensington for the collections of Natural History, was fully discussed for years in its various aspects; that finally a Select Committee of the House of Commons reported in favour of the expediency of the former plan; that the Standing Committee of the Trustees, than whom there is no one better qualified to give an opinion, took the same view; and that,

nevertheless, the Government of the time decided upon severing the collections, and locating the Natural History in a separate building, as the more economical plan.

The building was finished this year at a cost of £400,000, exclusive of the amount paid for the ground on which it is erected. It is built in the Romanesque, or round-arched gothic style, terra-cotta being almost exclusively employed in its construction. It consists of a basement, ground-floor, and two storeys, and is divided into a central portion, and a right and left wing. Its principal (southern) façade is 675 feet long. As you enter the portal you come into a cathedral-like hall, called the "Index Museum," 120 feet long, 97 feet wide, and 68 feet high; behind this there is a large side-lighted room for the British Fauna. On each side of the hall there is a side-lighted gallery, each 278 feet long by 50 feet in width; seven other galleries of various widths, and therefore adapted for various exhibitions, join at right angles the long gallery of the ground-floor. The first and second storeys are occupied by galleries similar to the main gallery of the ground-floor.

The collections are distributed in this building thus:—The western wing is occupied by Zoology, the eastern by the three other departments, *viz.*, the ground-floor by Geology, the first-floor gallery by Mineralogy, and the second-floor gallery by Botany. The central portion is, as mentioned above, divided into the room for British Zoology and into the "Index Museum," that is, "an apartment devoted to specimens selected to show the type-characters of the principal groups of organized beings." The basement consists of a number of spacious, well-lit rooms, well adapted for carrying on the different kinds of work in connection with such large collections.

There is no doubt that the building fulfils the principal condition for which it was erected, *viz.*, space for the collections. The Zoological collections gain more than twice as much space as they had in the old building, the Geological and Mineralogical about thrice, and the Botanical more than four times. This increase of space will enable the keeper of the last-named department to bring the collections correlated with each other into close proximity, and to prepare a much greater number of objects for exhibition than was possible hitherto. The Mineralogical Department, already so admirably arranged in the old building,

has now been supplied with the space requisite for a collection of rocks, with a laboratory and goniometrical room. Geology is now in a position to exhibit a great part of the *Invertebrata*, which hitherto had to be deposited in private studies, besides devoting one or two of the new galleries to a stratigraphical series. On the Zoological side we have been great gainers, not with regard to the proportion of space, but inasmuch as we were more impeded by the crowded state of our collections than any of the other departments: we are enabled to avoid the exhibition of heterogeneous objects in the same room or gallery: mammals, birds, reptiles, fishes, mollusks, insects, echinoderms, corals, and sponges have each a smaller or larger gallery to themselves. With the exception of the specimens preserved in spirits, the study-series can be located in contiguity with, or at least close vicinity to, the exhibition series. There is ample and convenient accommodation for students; besides a spacious room, centrally situated, and arranged for the exclusive use of students, this class of visitors can be accommodated at four other different localities immediately adjoining the several branches of the collection.

I believe that some of the members of the British Association will feel somewhat disappointed that the Zoological and Botanical collections on the one hand, and the Palæontological on the other, continue to be kept distinct. Who will, who can, doubt that the two branches of Biological science would be immensely benefited by being studied in their natural mutual relations? and that Palæontology, more especially, would have made surer progress if its study had been conducted with more direct application to the series of living forms? But to study the series of extinct and living forms in their natural connection is one thing, and to incorporate in a museum the collection of fossil with that of recent forms is another. The latter proposal, so excellent in theory, would offer in its practical execution so many and insuperable difficulties that we may well hesitate before we recommend the experiment to be tried in so large a collection as the British Museum. I have mentioned above that in a small collection such an arrangement may be feasible to a certain degree; but in a large collection you cannot place skins, bones, spirit-preparations, and stones in the same room, or perhaps in the same case, exposing them to the same conditions of light and temperature, without

injuring either the one or the other. Each kind of those objects requires for its preservation special considerations and special manipulations; and by representing them in each of the several departments you would have to double your staff of skilled manipulators, with their apparatus, which means multiplying your expenses. Departmental administration generally, and especially the system of acquisition by purchase or exchange, would become extremely complicated, and could not be carried on without a considerably greater expenditure in time and money. Thus, even if the old departmental division were abandoned for one corresponding to the principal classes of the animal kingdom, each of the new departments would still continue to keep, for consideration of conservation, those different kinds of objects, at least locally, separate. The necessity of this has been so much felt in the British Museum, that the Trustees resolved to store the spirit-specimens at South Kensington, in a building specially adapted for the purpose, and separated from the main building, as the accumulation of many thousand gallons of spirits is a source of danger which not many years ago threatened the destruction of a portion of the present building in Bloomsbury.

I could never see that by the juxtaposition of extinct and living animals the student would obtain particular facilities for study, or that the general public would derive greater benefit than they may obtain, if so inclined, from one of the numerous popular books; they would not be much the wiser if the *Archæopteryx* were placed in a passage leading from the reptile- to the bird-gallery. And it certainly cannot be said that the separation of living and extinct organisms, so universally adopted in the old museums, has been a hindrance to the progress of our knowledge of the development of the organic world. This knowledge originated and advanced in spite of museums-arrangements. What lies at the bottom of the desire for such a change amounts, in reality, to this, that museums should be the practical exponents of the principle that zoologists and botanists should not be satisfied with the study of the recent fauna and flora, and that palæontologists should not begin their studies or carry on their researches without due and full reference to living forms. To this principle every biologist will most heartily subscribe; but the local separation of the various collections in the British Museum will not offer any obstacles whatever to its being carried out.

The student can take the specimens (if not too bulky) from one department to the other; he may examine them in the gallery without interference on the part of the public; or he may have all brought to a private study, and, in fact, be in the same position with regard to the use of the collections as those who have charge of them. A plan which has been already initiated in the old building will probably be further developed in the new, *viz.*, to distribute in the palæontological series such examples of important living types as will aid the visitor in comprehending the nature and affinities of the creatures of which he sees only the fragmentary remains.

With regard to the further arrangement of the collections in the new building, it has long been understood that the exhibition of all the species, or even the majority of them, is a mistake; and that, therefore, two series of specimens should be formed, *viz.*, one for the purposes of advanced scientific study—the study-series, and the other comprising specimens illustrative of the leading points both of popular and scientific interest; this latter—the exhibition-series—being intended to supply the requirements of the beginner in the study of natural history, and of the public. As the zoological collections are better adapted for exhibition than the others, the following remarks refer principally to them. The bulk of our present exhibition-series is the growth of many years, and to convert it into one which fulfils its proper purpose is a gradual and slow process; nor can it be expected to reveal its character until it has been removed into the new locality. The exhibition will be probably found more liberal than may be deemed necessary by some of my fellow-labourers; but if a visitor should, on leaving the galleries, “take nothing with him but sore feet, a bad headache, and a general idea that the animal kingdom is a mighty maze without plan,” I should be inclined to believe that this state of bodily and mental prostration is the visitor’s, and not the curator’s fault. The very fact that the exhibition-series is intended for a great variety of people renders it necessary to make a liberal selection of specimens, and I simply follow the principle of placing in it all those objects which, in my opinion, the public can understand and appreciate, and which therefore must contribute towards instruction. The public would receive but an inadequate return for keeping up a National Museum if they were shown, for instance, a dozen so-called “types” of the

family of parrots or humming-birds; they require a good many more to see what Nature can produce in splendour and variation of colour, in grotesqueness of form; or to learn that whilst one of these groups of birds is spread all over the countries of the tropical zone, the other is limited to a portion of a single continent. To render such an exhibition thoroughly useful two additional helps are required, *viz.*, a complete system of explanatory labels, and a popularly-written and well-illustrated handbook, which should not only serve as a guide to the more important and interesting specimens, but give a systematic outline of the all-wise plan which we endeavour to trace in God's creation.

There is one part of the Museum which I intend to treat in a different manner from the rest, and that is the collection of British animals. For the same reasons for which I have in a former part of this address insisted on District Faunas being fully represented in Provincial Museums, I consider a complete exhibition of the British Fauna to be one of the most important objects of the National Museum. Its formation is, strange as it may appear to many of you, still a desideratum, and a task which will occupy many years. It will not be easy (especially when you are in danger of infringing an Act of Parliament) to form a complete series of British birds showing their changes of plumage, their young, their eggs, their mode of nidification; it is a long work to collect the larvæ and chrysalides of insects, and to mount the caterpillars with their food-plants; and we shall require the co-operation of many a member of the British Association when we extend the collection to the marine animals and their metamorphoses. But all the trouble, time, and labour spent will be amply repaid by the direct benefits which all classes will derive from such a complete British collection.

My time is becoming short, and yet I find that I am far from having completed the task I had set myself. Therefore let me briefly refer only to a few points which of late have much agitated those who feel a direct or indirect interest in the progress of the National Museum.

In the first place we must feel deeply concerned in everything relating to the conservation of the collections. If the objects could speak to you as they do to those familiar with their history, many of them would tell you of the long hours of patient inquiry spent upon them; many might point with pride at the long pages

written about them—alas! not always with the even temper which renders the study of natural science a delight and a blessing; others would remind you of having been objects of your wonder when you saw them depicted in scientific books, or in some household work; whilst not a few could tell you pitiful tales of the enthusiastic collector who, braving the dangers of a foreign climate, sacrificed health or life to his favourite pursuit. Collections thus obtained, thus cherished, representing the labours of thousands of men, and intended to instruct hundreds of thousands, are worth preserving, displaying, and cultivating. No cost has been spared in housing them; let no cost be spared in providing proper fittings to receive them, a sufficient staff to look after them, and the necessary books to study them.

What we chiefly require in a well-constructed exhibition-case is that it should be as perfectly dust-proof as possible, that it should lock well and easily, and yet that it should be of a light structure. Everyone who has gone through a gallery of our old-fashioned museums must have noticed how much those broad longitudinal and transverse bars of the wooden frame of the front of a case interfere with the inspection of the objects behind them, hiding a head here, a tail there, or cutting an animal into two more or less unequal portions. Ill-constructed cases have brought zoological collections as much into bad repute as bad stuffers; and if it be thought that a pound could be saved in the construction of a case, that pound will probably entail a permanent expense of a pound a year. Now, all the requisites of a good exhibition case can be obtained by using metal wherever it can be substituted for wood; and, although its use is more expensive than that of wood, you will join with me in the hope that no mistaken desire of economy will prevail now, as the time has arrived to furnish our priceless collections with adequate fittings.

Probably all of those present are aware that the formation of a Natural History Library has been urged almost from the very first day on which the removal of the Natural History collections to South Kensington was proposed. But the cost and extent of such a library have been very variously estimated. And I am sorry to say that it is, I believe, owing to expressions of opinion on the part of those who ought to know better, that the cost of this library was considerably underrated when the removal to South Kensington was determined upon. We cannot blame the

Government that they hesitated for years before they acceded to the pressing representations of the Trustees of the British Museum, to begin with its formation, when they were told by naturalists that the cost of such a library would be something between £10,000 and £20,000. I could hardly believe my eyes when I read only a few weeks ago, in the leader of a weekly periodical specially devoted to science, that "had the Trustees put aside a thousand a year for this purpose when it was first determined to remove the Natural History collections ten years ago, there would have been by this time in existence a library fully adequate to the purpose." The writer must have either a very poor idea of the objects and work of a National Museum, or an imperfect knowledge of the extent of the literature of Natural History. £10,000 might suffice to purchase a good ornithological library, and £1000 would purchase the annual additions to all the various branches of natural history; but the former sum would be much too small if the purchase of those works only were intended which are required for the technical work of naming animals, plants, fossils, and minerals. A better calculation was made by the Select Committee of the House of Commons on the British Museum in 1860, who stated that the formation of a Natural History Library would cost about £30,000 at the present time (1860). Considering that twenty years have elapsed since, and that this part of the literature has shown year by year a steady increase, we must put our estimate considerably higher than the writer of that article.

With the aid of some of my friends who know, from their daily occupation, the market value of Natural History works, I made a calculation some years ago, and we came to the conclusion that a complete Natural History Library will cost £70,000; and, unpalatable as this statement may be to those who have advocated the removal of the Natural History collections, and therefore must be held responsible for this concomitant expense, it will be found to be true. It will be satisfactory to you to learn that the Government have at last sanctioned the expenditure of half that amount.

Now, in my opinion, such a library formed in connection with the National Museum should not be reserved for the use of the officials, but I would recommend that it should be accessible to the general class of students in the same manner as any other

part of the collections. It is for this reason that I wish to see it rendered as perfect as possible with respect to the older publications (many of which are getting scarcer year by year), as well as to the most recent. Whether or not a similarly perfect collection of Natural History books exists in some other place in London, is another question with which I am not concerned. The general Natural Library evidently ought to contain a perfect set of books on Natural History, irrespective of other claims; but to have Natural History collections in one place, and the books relating to them in another, miles away, will produce as much inconvenience as is experienced by the person who puts the powder into one barrel of his gun and the shot into the other.

If the British Museum (for the collections will remain united under this old time-honoured name, though locally separated) continues to receive that support from the Government to which it is justly entitled, I have no doubt that it will not only fulfil all the aims of a National Collection, but that it will be also able to give to the kindred provincial institutions the aid which has recently been claimed on their behalf. Under an Act of Parliament which was passed in the previous Session, and which empowers the Trustees to part with duplicate specimens, several of those Museums have already received collections of zoological objects. But I consider it my duty to caution those who are in charge of those Museums to be careful as to the manner in which they avail themselves of this opportunity. Well-preserved duplicates of the rarer and more valuable vertebrate animals are very scarce in the British Museum, the funds for purchase being much too small to permit the acquisition of duplicates. What we possess of this kind of duplicates are generally deteriorated specimens, and therefore ought not to be received by Provincial Museums. On the other hand, our invertebrate series, especially of Mollusks and Insects, will always offer a certain number of well-preserved duplicate specimens and a sufficient inducement for Provincial Museums to select their desiderata.

It has been suggested that, as the British Museum has correspondents and collectors in almost every part of the globe, and has therefore greater facilities for obtaining specimens than any other institution, it should systematically acquire duplicates, and form a central repository, from which Provincial Museums could draw their supplies. If the necessary funds to carry out

this scheme were granted, I cannot see any objection to it on the part of the British Museum, which, on the contrary, would probably derive some benefit. But there is one, and in my opinion a very serious, objection, *viz.*, that this scheme would open the door to the employment of curators of inferior qualifications; it would relieve the curator of a Provincial Museum of an important part of his duty, *viz.*, to study for himself the requirements of his Museum, the means of meeting them, and to become well acquainted with the objects themselves. A curator who has to be satisfied with the mechanical work of displaying and preserving objects acquired, prepared, and named for him by others, takes less interest in the progress of his Museum than he whose duty it would be to *form* a collection; he is not the person in whose charge the Museum will flourish.

In speaking of the claims of Provincial Museums on the National Museum, the kindred Colonial institutions should not be forgotten. We owe to them much of our knowledge of the Natural History of the Colonies; they are the repositories of the collections of the temporary and permanent surveys which have been instituted in connection with them, and they have concentrated and preserved the results of manifold individual efforts which otherwise most likely would have been lost to Science. The British Museum has derived great benefit from the friendly relations which we have kept up with them, and therefore they are deserving of all the aid which we can possibly give them, and which may lessen the peculiar difficulties under which they labour in consequence of their distance from Europe.

I am painfully aware that in the remarks which I have had the honour of making before you, I have tried the patience of some, and not satisfied the expectations of others. But so much I may claim:—that the views which I have expressed before you as my own are the results of many years' experience, and therefore should be worthy of your consideration; and that I am guided by no other desire than that of seeing the Museums in this country taking their proper place in regard to Biology, and as one of the most important aids in the instruction of the people.

NOTES ON THE FRESH-WATER FISHES OF INDIA.

BY FRANCIS DAY, F.L.S.

THE fishes inhabiting the fresh waters of India, Burma and Ceylon may be divided into those which enter from the sea for breeding or for predatory purposes, and those which pass their lives more or less without descending to the salt water. Of the first class I do not propose giving any detailed description beyond a casual remark when the breeding of fish, or the fisheries, come under review.

An exhaustive account of all the strictly fresh-water forms would doubtless be interesting scientifically, but hardly so to the fisherman or general reader; consequently I shall restrict myself to observing that the fisheries above alluded to contain about 369 species, appertaining to eighty-seven genera. Of the spiny-rayed, or *Acanthopterygian* order, we have nineteen genera, the members of which are most numerous in the maritime districts and deltas of large rivers, while their numbers decrease as we proceed further inland. Few are of much economic importance, if we except the Common Goby, Spined Eels (*Mastacembelidæ*), the Snake-headed Walking-fishes (*Ophiocephalidæ*), and the Climbing Perch and its allies. Of the Sheat-fish, or scaleless Siluroids, we have twenty-six genera; the mouths of these are provided with sensitive feelers, which, serving as organs of touch, assist them while seeking their prey in turbid waters. All that are of sufficient size are esteemed as food, although, owing to their propensity for consuming unsavoury substances, their wholesomeness appears at times to be questionable. The next three genera, *Belone* (Gar-pike), *Cyprionodon* and *Haplochilus*, are of but little value; but the thirty-five genera of Carps and Roaches are of the greatest possible consequence, affording a large amount of food to the population of the country. The remaining four genera, consisting of the curiously flattened *Notopterus* and three forms of Eels, are of but little mercantile importance.

How the reproduction of these fishes is carried on becomes a most necessary subject for investigation, in briefly considering which we might inquire, what migrations they undertake for this purpose? whether the parents are monogamous, polygamous, or annuals, dying after the reproduction of their species? the

time of year when spawning occurs? whether this is deleterious to the parent? the size of the eggs, their colour; whether they float or sink, are deposited in running or stagnant waters? whether they are covered or left uncovered in their nests? whether the male carries them about or protects them? and whether their germination can be retarded by artificial means or natural causes, as by the action of cold or their immersion in mud?

That anadromous forms, as the Salmon or Shad of Europe, or the Shad (*Clupea palasah*) of India, migrate from the sea to the fresh waters to deposit their eggs in localities most suitable for their reception, is well known. If we examine into the migration of Indian fishes for breeding purposes we find this takes place with three classes, *viz.*—(1) anadromous forms from the sea to the fresh waters, as already referred to; (2) species which may be considered to pertain to the mountains, or else deposit their ova in the rivers of the hills; (3) those which are restricted to the plains, but which likewise undertake certain changes of locality at these periods.

Of the migratory hill fishes the various forms of large Barbels, termed “Mahaseers,” furnish good examples. In the Himalayas they ascend the main rivers, but turn into the side-streams to breed; while on the less elevated Neilgherry mountains, in the Madras Presidency, the same phenomenon occurs, but with this difference, that they deposit their ova in the main streams, because these are small, owing perhaps to their never being replenished with snow-water. Occasionally the fish are too large to ascend these mountain rivers, when it would appear they breed at the bases of the hills; whether it is from the offspring of these that this genus has extended through the plains it is not my present purpose to inquire. When the rivers commence being in flood adult fish are able to ascend to feeding grounds previously inaccessible to them. Having spawned, they keep dropping gently down stream, during which time the amount of water is diminishing; thus the ova, when hatched, are completely cut off from the locality where the parent fish reside, precluding their making a meal of them. The fry, therefore, have the heads of the rivers to themselves in perfect security, and each torrent becomes transformed into a small stream intersected by pools, where they can remain until the next rains enable them to descend to the larger rivers.

Of the migratory fishes of the plains many forms of Carp may be observed, more particularly where impassable weirs exist: here they may be seen attempting to jump over the obstruction; and so common is this occurrence that the natives of India hang baskets, cloths, even native cots turned upside down, or anything equally suitable, over the sides of the weirs, and into this the fish fall.

In Asiatic waters both monogamous and polygamous forms exist, while other phenomena as to breeding deserve attention. The walking or snake-headed fishes, *Ophiocephalidæ*, of India, and other amphibious genera, are perhaps the best known of monogamous fishes; some of them reside in ponds, others prefer rivers, where they take up their residence in deserted holes which they find in the banks. The pond species delight in lying at the grassy margins where the water is not sufficiently deep to cover them; and here they are able to respire atmospheric air direct. The Striped Walking-fish constructs a nest with its tail among the vegetation, and bites off the ends of the water-weeds; here the ova are deposited, the male keeping guard; but should he be killed or captured the vacant post is filled by his partner. The Hissar, *Callichthys*, of South America, is likewise monogamous, constructing a nest, which is also defended. The majority of fishes are unquestionably polygamous, as has been repeatedly observed, perhaps as distinctly in the case of the Salmon as any other species in a wild state, as well as Sticklebacks resident in aquaria; while doubtless fishes which migrate in shoals for breeding purposes, as the Mackarel, Herring, and some forms of Carp, are all polygamous. Warrington considered that when the Stickleback had propagated its species it died; and Collet has given us an account of how some globose fishes, *Latrunculus pellucidus*, spawn in August, and when this has been accomplished they disappear, becoming, as he supposes, extinct—being, in fact, annuals among animals.

The time of year at which spawning is effected varies with the locality and the family of fish, and depends also on the temperature of the water and other local causes, while there are some fishes which only breed once a year, others more frequently. Some fishes do not appear to feed during the season of depositing their spawn, as the Salmon, the Shad, and the siluroid *Ariinæ*. In this country the Twaite Shad leaves the sea at the end of May

or commencement of June, ascending some of our largest rivers to spawn. In India another Shad—termed “Pulla” in the Indus, “Ulum” by the Tamils, “Sable-fish” by the Madrassees, “Palasah” by the Telingis, “Hilsa” or “Ilisha” in Bengal, “Nga-tha-louk” by the Burmese—is very similar in many respects to the British species, while it is also anadromous, breeding in rivers as already described. In Sind they ascend the Indus in February to spawn, descending in September. In the Cauvery, in Madras, they pass up when the first burst of the June monsoon fills the river, and they continue doing so for the succeeding four months. In the Kistna, which has a far greater velocity, but, similarly to the Cauvery, is filled in June, they defer their ascent until September, but it is not until the end of the month, or commencement of October, when the river is subsiding and its velocity decreasing, that the majority arrive; whereas in the neighbouring river, the Godavery, in which the current is less rapid, these fishes ascend earlier to spawn, being most numerous from July to September. In the Hooghly they continue ascending throughout the June monsoon, and many are found still in roe in September. The main bodies of these fish ascend the large rivers of India and Burma generally when the June monsoon commences, but not always at the same period, the ascent at times being dependent upon the rapidity of the current and other causes. That it is not solely due to the presence of rain-water flooding the rivers is evident, because those of the Indus and Irrawaddi are mainly caused by melting snows at this period; and in the latter river these fishes push on to Upper Burma, to which country the monsoon scarcely extends, but where the inundations are due to snow-floods. The cause of the majority of fishes at these various periods ascending the different rivers to spawn may be due to their having been bred there, while inherited instinct causes them to select the most suitable times, when the shallows are covered with water and ascent is rendered practicable. It has been remarked that occasionally a very cold winter retards the breeding of the Salmon and their allies; and Dr. John Davy observed, at Eisenhartz, that he obtained Charr just about to spawn at the end of May, while in England they spawn in the winter, and he considers this must depend upon the weather. “If,” says that excellent observer, “summer is the spawning time of the Charr and Trout in the lakes of Southern Austria, it is

connected with, or owing to, the water at that time being of the temperature best fitted for the purpose, most of these lakes being fed by mountain streams, frozen in the winter, and full in summer from the melting of the snow." The salmonoid Grayling spawns in April or May; but without entering more minutely into this question, it is evident that fishes of the same family, genus, or even species may spawn at different periods, owing to local or climatic causes. There are also other fishes which deposit their ova twice yearly, if not more frequently; these are generally fresh-water forms, and not rare, especially in tropical countries, as, for example, the Walking-fishes.

To the question, whether the effect of spawning has any deleterious effect upon the parent fishes? two replies may be given, as in some cases it renders their flesh unwholesome, while in others it does not cause their character as to food to be altered. The Shad in the East is excellent eating up to the period when it has deposited its eggs, subsequent to which it becomes thin, flabby, and positively unwholesome; the Salmon is then in a similarly unhealthy lean and lank condition, which renders it unsuitable for the table. Fresh-water fishes that deposit a smaller number of eggs, or perhaps do so more gradually, or twice at least during the year, are not so deleteriously affected by breeding, this condition being mostly restricted to the anadromous forms.

The size of the eggs, their colour, and whether deposited in ponds or in the sea, are likewise questions to be determined. The species which produce the greatest number of eggs are often those which live in large communities and spawn once a year. Thus, in the Codfish, one of 20 lbs. had 4,872,000, another of 11½ lbs. weight, 1,800,000, while in a third instance, in which the roe weighed 7¾ lbs., there were 7,546,400 eggs. In an Indian Shad I found 1,023,645 eggs; a Turbot of 8 lbs., 385,200; a Brill of 4 lbs., 239,775; a Flounder of 1½ lb., 1,357,400; a Sole of 1 lb., 134,466. But other species likewise have numerous eggs. I observed 410,500 in a Barbel (*Barbus sarana*) in India; a Tench of 2½ lbs. contained, according to Harmer, 383,252. On the other hand, some fishes have large eggs, as the Salmonoids, some Sheatfishes, and a few Indian Carps (*Barilius*). The editor, when reporting some of Herr Malmgren's exceedingly interesting investigations upon *Salmonidæ*, in the 'Zoological Record' for 1864, says of the eggs of members of the Salmon family:—"The

size of the ova is not invariably the same in individuals of whatever size, but, as far as our experience reaches, is even often characteristic of the species of a genus." Dr. John Davy, in 1852, published the result of his accurate investigations upon this point, for which purpose he selected the Charr. He says of the ova:—"Those I have examined I have found to vary in diameter from 0·16 to 0·18 and 0·20 of an inch, and in weight (after removal of the adhering moisture by wiping), from 0·7 to 1· grain each." I have personally measured the size of fourteen ova taken from a single example of an Indian siluroid (*Osteogenciosus*); they were 0·4 to 0·5 of an inch in diameter, thus showing variations in the size of the ova from a single fish results confirming the investigations of Davy in a Charr. If the size can thus vary in the eggs from one specimen, it does not seem remarkable that it may do so more widely in nearly related genera; thus, the Smelt (*Osmerus*), belonging to the Salmon family, has by no means large ova, for in two examples, each weighing two ounces, there were found in one 38,278 eggs, and in the other 36,652 eggs. Davy counted 1230 ova in a Charr, while in the Salmon and Trout it has been observed that they carry somewhere about 1000 eggs to each pound of weight. Such a proportion, however, does not apply to those which are less than one pound, and even in larger fish it is subject to considerable variation. In fishes that spawn at least twice a year, and likewise protect their young, the number of eggs is less than what generally obtains in other genera. Thus in a Walking-fish (*Ophiocephalus*) I found 4700.

As to the colour of fish-eggs, they are very various; in some fresh-water siluroids they are of a light pea-green, as I have observed in the Indian Scorpion-fish, and as also occurs in *Silurus glanis*, while in the Salmon and Trout, and Grayling, they may be coral-red, yellow, or pure white. As to the places where fish deposit their eggs, these are exceedingly various, as might be anticipated, because some sink in the water while others float. Professor Sars found the ova of several of our best-known fishes floating on the surface of the sea, where they remain during the whole period of their development; among such as he was able to hatch out were those of the Cod, Haddock, Mackarel, Plaice, Gar-fish, and a Gurnard. This fact is interesting because it shows that trawl-nets could not occasion injury to these eggs,

whatever they might do to the young. On the contrary, the eggs of the Herring sink, as do likewise those of most fresh-water fishes. Anadromous fishes apparently deposit their spawn in running water, but in different ways; the native fishermen in India consider those of the Shad float, whereas we are aware those of the Salmon family sink; but even among these fishes we perceive a great difference in treatment of the eggs. The Smelt, says Parnell, "shed their spawn in immense quantities about two miles below Stirling Bridge, when, at that time, every stone, plank, and post appear to be covered with their yellowish ova." The Grayling deposit their roe on the gravel, while the Salmon and Trout cover their ova, which are furnished with a tough and elastic outer covering, with sand and gravel. Other fresh-water forms spawn in muddy ponds or slowly-flowing rivers, where the eggs of the *Salmonidæ*, as a rule, would never arrive at maturity. Some fish-eggs, as already observed, float upon the surface of the water. The eggs of the Gar-fish, observes Mr. Dunn, are "found to be covered with flexible hooks, which, without any help from the parent fish, fasten themselves to any floating marine object." In fresh waters the eggs of fishes may remain at the bottom, either covered or uncovered.

(To be continued.)

THE WILD BIRDS PROTECTION ACT, 1880.

[FOLLOWING the precedent occasioned by the passing of the Wild Fowl Preservation Act, 1876, and in compliance with the wishes of several correspondents who desire to be informed how the law at present stands on this subject, we print the Act which has recently received the royal assent, and which will come into operation on the 1st January next.

The general effect of this, briefly speaking, is as follows:—The Sea Birds Act, 1869, the Wild Birds Act, 1872, and the Wild Fowl Act, 1876, are all repealed, and a close time is provided for *all* birds between the 1st March and the 1st August. Those species which are mentioned in the Schedule may not be killed during the close time, under a penalty not exceeding £1; those *not* mentioned in the Schedule may not be killed under a penalty (for a second offence) of a sum not exceeding 5s. and costs.

In the case of the latter class, the Act does not apply to the owner or occupier of the land on which any of these birds may be killed, or to any

person duly authorised by owner or occupier. In other words, if any owner or occupier deems it desirable to keep down Sparrowhawks, Jays, Hooded Crows, Wood Pigeons, or any other bird which he may consider destructive, he may destroy them on his own land, or authorise some one else to do so.

The Home Secretary still has power to vary the close time upon application of justices at Quarter Sessions, as he was formerly enabled to do by the Act of 1876, now repealed.—ED.]

AN ACT TO AMEND THE LAWS RELATING TO THE PROTECTION OF
WILD BIRDS.

[43 & 44 Vict., c. 35, 7th September, 1880.]

WHEREAS it is expedient to provide for the protection of wild birds of the United Kingdom during the breeding season :

Be it therefore enacted by the Queen's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows :

1. This Act may for all purposes be cited as the Wild Birds Protection Act, 1880.

2. The words "wild birds" shall for all the purposes of this Act be deemed to mean all wild birds. The word "sheriff" shall include steward and also sheriff substitute and steward substitute.

3. Any person who between the first day of March and the first day of August in any year after the passing of this Act shall knowingly and wilfully shoot or attempt to shoot, or shall use any boat for the purpose of shooting or causing to be shot, any wild bird, or shall use any lime, trap, snare, net, or other instrument for the purpose of taking any wild bird, or shall expose or offer for sale, or shall have in his control or possession after the fifteenth day of March, any wild bird recently killed or taken, shall, on conviction of any such offence before any two justices of the peace in England and Wales or Ireland, or before the sheriff in Scotland, in the case of any wild bird which is included in the schedule hereunto annexed, forfeit and pay for every such bird in respect of which an offence has been committed a sum not exceeding one pound, and, in the case of any other wild bird, shall for a first offence be reprimanded and discharged on payment of costs, and for every subsequent offence forfeit and pay for every such wild bird in respect of which an offence is committed a sum of money not exceeding five shillings, in addition to the costs,

unless such person shall prove that the said wild bird was either killed or taken or bought or received during the period in which such wild bird could be legally killed or taken, or from some person residing out of the United Kingdom. This section shall not apply to the owner and occupier of any land, or to any person authorised by the owner or occupier of any land, killing or taking on such land any wild bird not included in the schedule hereto annexed.

4. Where any person shall be found offending against this Act, it shall be lawful for any person to require the person so offending to give his Christian name, surname, and place of abode, and in case the person so offending shall, after being so required, refuse to give his real name or place of abode, or give an untrue name or place of abode, he shall be liable on being convicted of any such offence to forfeit and pay, in addition to the penalties imposed by section three, such sum of money not exceeding ten shillings sterling as to the justices or sheriff shall seem meet.

5. All offences under this Act may be prosecuted, and penalties and forfeitures under this Act recovered,—

(1.) In England in manner provided by the Summary Jurisdiction (England) Acts; and

(2.) In Scotland before the sheriff in manner provided by the Summary Procedure Act, 1864, and any Acts amending the same; and

(3.) In Ireland within the police district of Dublin metropolis, in manner provided by the Acts regulating the powers and duties of justices of the peace for such district or of the police of such district, and elsewhere in Ireland before two justices in manner provided by the Petty Sessions (Ireland) Act, 1851, and any Act amending the same.

6. All offences mentioned in this Act which shall be committed within the jurisdiction of the Admiralty shall be deemed to be offences of the same nature and liable to the same punishments as if they had been committed upon any land in the United Kingdom, and may be dealt with, inquired of, tried, and determined in any county or place in the United Kingdom in which the offender shall be apprehended or be in custody or be summoned, in the same manner in all respects as if such offences had been

actually committed in that county or place; and in any information or conviction for any such offence, the offence may be averred to have been committed "on the high seas." And in Scotland any offence committed against this Act on the sea coast or at sea beyond the ordinary jurisdiction of any sheriff, justice or justices of the peace, shall be held to have been committed in any county abutting on such sea coast or adjoining such sea, and may be tried and punished accordingly.

Where any offence under this Act is committed in or upon any waters forming the boundary between any two counties, districts of quarter sessions, or petty sessions, such offence may be prosecuted before any justices of the peace or sheriff in either of such counties or districts.

7. This Act shall come into operation on the first day of January one thousand eight hundred and eighty-one, and on the same day the Act passed in the session of Parliament holden in the thirty-second and thirty-third years of the reign of Her present Majesty, entitled "An Act for the preservation of Sea Birds," and the Act passed in the session of Parliament holden in the thirty-fifth and thirty-sixth years of the reign of Her present Majesty, entitled "An Act for the protection of certain wild birds during the breeding season," and the Act passed in the session of Parliament holden in the thirty-ninth and fortieth years of the reign of Her present Majesty, entitled "An Act for the preservation of Wild Fowl," shall be repealed.

8. One of Her Majesty's Principal Secretaries of State as to Great Britain, and the Lord Lieutenant as to Ireland, may, upon application of the justices in quarter sessions assembled of any county, by order extend or vary the time during which the killing and taking of wild birds or any of them is prohibited by this Act; after the making of which order the penalties imposed by this Act in respect of such wild birds shall in such county apply only to offences committed during the time specified in such order; and the order for the extension or variation of such time shall be published, if made by the Secretary of State, in the London Gazette, or if made by the Lord Lieutenant, in the Dublin Gazette, and a copy of the London Gazette or Dublin Gazette containing any order made under this Act shall be evidence of the same having been made.

9. The operation of this Act shall not extend to the Island of Saint Kilda, and it shall be lawful for one of Her Majesty's

Principal Secretaries of State as to Great Britain, and for the Lord Lieutenant as to Ireland, where it shall appear desirable, from time to time, upon the application of the justices in quarter sessions assembled in any county, to exempt any such county or part or parts thereof, as to all or any wild birds, from the operation of this Act; and every such order shall be published and may be proved in the manner provided in the preceding section.

SCHEDULE.

American Quail.	Kittiwake.	Sea-lark.
Auk.	Lapwing.	Sea-mew.
Avocet.	Loon.	Sea-parrot.
Bee-eater.	Mallard.	Sea-swallow.
Bittern.	Marrot.	Shearwater.
Bonxie.	Merganser.	Sheldrake.
Colin.	Murre.	Shoveller.
Cornish Chough.	Night-hawk.	Skua.
Coulterneb.	Nightjar.	Smew.
Cuckoo.	Nightingale.	Snipe.
Curlew.	Oriole.	Solan Goose.
Diver.	Owl.	Spoonbill.
Dotterel.	Ox-bird.	Stint.
Dunbird.	Oystercatcher.	Stone Curlew.
Dunlin.	Peewit.	Stonehatch.
Eider Duck.	Petrel.	Summer Snipe.
Fern Owl.	Phalarope.	Tarrock.
Fulmar.	Plover.	Teal.
Gannet.	Plover's-page.	Tern.
Goatsucker.	Pochard.	Thick-knee.
Godwit.	Puffin.	Tystey.
Goldfinch.	Purre.	Whaup.
Grebe.	Razorbill.	Whimbrel.
Greenshank.	Redshank.	Widgeon.
Guillemot.	Reeve or Ruff.	Wild Duck.
Gull (except Black-backed Gull).	Roller.	Willock.
Hoopoe.	Sanderling.	Woodcock.
Kingfisher.	Sandpiper.	Woodpecker.
	Scout.	

OCCASIONAL NOTES.

THE DOMESTICATION OF DEER.—A very interesting correspondence is published in 'The American Naturalist' for June between Mr. Brown, the Superintendent of the Philadelphia Zoological Gardens, and Mr. J. D. Caton. It relates chiefly to the domestication of species of deer. Of the twelve species kept in the Philadelphia Gardens the Mule-deer, *Cervus macrotis*, bred during 1878 and 1879; of five fawns one died when two days old; the other four, though most carefully nursed and fed with astringent food, as well as supplied with iron water and gentian powders, &c., all died of a diarrhoea caused by malignant disease. Five specimens of Moose-deer and eight of Caribou died at periods varying from three months to two years and five months in the Moose and not beyond nine months in the Caribou from hypertrophy of the heart. The Pronghorn, *A. americana*, all died speedily from diarrhoea or hypertrophy of the heart; change of food and tonics seemed to have no effect upon them. Of ten or twelve individuals none lived more than fifteen months. The Wapiti and common deer, *C. virginianus*, however, have done well, and several fawns were raised of *C. campestris*, *C. aristotelis* and *C. dama*. Of *C. leucurus* the Gardens possessed but a single specimen. In the case of the Mule-deer, Mr. Brown is disposed to account for the mortality by the difficulty of supplying them with a sufficient amount of their proper (arboreal) food, which has to be replaced by dry food and grass. Mr. Caton, writing from Ottawa, Illinois, states that he has lost the last of his stock of Mule-deer and also of *C. columbianus*, and that he is satisfied that they cannot be successfully domesticated in his grounds. He concludes that they get at something which does not agree with them; indeed all his experiments with ruminants, *feræ nature* whose natural habitat is confined to the United States west of the Missouri River, have proved failures. Mr. Caton has succeeded well in hybridising the Virginian deer with the Ceylon deer and the Acapulco deer. The hybrids seem to be perfectly healthy and prolific, several of the hybrids from the Virginian deer and Acapulco buck having borne perfectly healthy twin fawns. On some of the hybrids the metatarsal gland is wanting, and on some it is present, while some have it on one hind leg and not on the other.

ENFORCED DESTRUCTION OF RABBITS IN NEW ZEALAND.—As an instance of the enormous increase of Rabbits in some parts of New Zealand, more particularly in one of the up-country districts of Otago Province, a recent number of the 'Tuapeka Times' gives the following statistics:—On a single day no less than 40,000 skins were brought from Messrs. Strode and Fraser's station at Earnsclough to the railway-station at Clyde, there to be despatched to Port Chalmers for shipment to the London market. On

this one estate eighteen poisoners are employed, while six men with pack-horses (known as "packers") are engaged in conducting traffic between the home station and the rabbiters' camp in the ranges, carrying out poisoned wheat and necessary supplies, and returning with the rabbit-skins. Two men and a clerk find full employment at the station in making up poisoned wheat, and fixing up and despatching the bales. A waggoner is engaged in conveying wheat to the home station, and bales of skins from there to Lawrence. Some days ago he brought down 22,000 skins; on Monday, as we have said, he had 40,000, and at the station, when he left it, there were other 40,000 in readiness to be despatched to the railway; and still there are no symptoms of the traffic diminishing. Messrs. Strode and Fraser supply the rabbiters with poisoned grain at the rate of 8s. per 100 lbs., and purchase the rabbit-skins at 2d. each. The men are earning from 20s. to 30s. a-day, and more men would be taken on but cannot be had. Some of the so-called "unemployed" were offered work, but declined it, preferring their chance of loafing on the industrious along the road. While these particulars refer to Earnsclough Station, it is only fair to mention that the other runholders are pursuing similar measures in concert, and by arrangement arrived at in public meeting. The poison does not seem to be taken by the sheep. Although the country "stinks with rabbits," yet the tide appears to have fairly turned; already in many places where the grass was formerly devoured down to the roots, it has again resumed its verdant hue, and forms good pasture for the sheep. As an instance of what other runholders are doing, we may note that Messrs. Cargill and Anderson have six men employed, who are working their run, and making a "fine clean job of it." Their men are said to be earning 20s. to 25s. a-day each. The work of destruction is calculated to last for the next six months; and this is another inducement to men who really want work and cannot find it to inquire for themselves "whether these things are so."

THE BEAVER IN NORWAY.—In a foot-note to Mr. A. H. Cocks' interesting article under this heading in 'The Zoologist' for June last reference was made (p. 234) to some remarks on the subject to be found in Bowden's 'Naturalist in Norway' (1869). Not having the book by me at the time I was unable to quote it, but have since found the passage referred to (p. 73), which runs as follows:—"The Beaver was formerly very common in Norway, and was principally found in Soloer, Österdalen, Gudbrandsdalen, and Jemteland; there is still a Bøever-dalen and a Bøever-elo, or river, in Österdalen. It is now only to be met with on the estate of a Mr. Aall, a gentleman who resides near Arendal, in the South of Norway."—J. E. HARTING.

PORPOISES CHASING MACKAREL.—On July 31st I was on the Point watching a shoal of Mackarel coming out of Pra Sand, and leisurely going

due west up the current of the tide, playing on the surface. They had passed about half-way across the bay, and were about a mile from the sand, when a school of Porpoises (*Delphis delphinus*), over thirty in number, came up leisurely from the southward into the sand. After awhile they came across the track of the Mackarel, and a curious change took place. The whole school turned westward at once, and gave chase at racing speed after the Mackarel. In less than five minutes the Porpoises were in the midst of the Mackarel, and a very lively scene ensued. The Mackarel rushed violently forward on the surface of the water, raising a white wave. Hundreds of fish were constantly leaping feet high out of the water at the same time, and all the while the black backs of the Porpoises, going in and out and backwards and forwards through their ranks, showed where they were dealing havoc. Thus engaged they passed out of sight round another point of land. I feel satisfied that the Porpoises could not have sighted the Mackarel when they turned to give chase, and therefore take it for granted they must have scented them.—THOMAS CORNISH (Prussia Cove, Marazion).

SOLITARY SNIPE IN NORTHAMPTONSHIRE.—A specimen of the Great or Solitary Snipe, *Scolopax major*, was shot yesterday (Sept. 13th) in a meadow on the Nen near Thorpe Waterville, by my friend and neighbour, Mr. George E. Hunt, of Wadenhoe House, who brought the bird to me; it weighs a little over seven ounces and three-quarters, and is a mass of fat. This is the first of this species which has been obtained in this neighbourhood in my recollection, though I saw one many years ago on a dry bean-stubble whilst I was loading my gun after firing both barrels at Partridges, and in spite of an hour's close search could not flush it again. Mr. Hunt, above mentioned, shot a bird very near the spot where he killed this Great Snipe, but he could not recover it; this was about this time of year some two or three years ago. I may mention that several persons have informed me of their having seen Solitary Snipes in this part of our county; but, in the majority of instances, these birds have proved on investigation to be Green Sandpipers, *Totanus ochropus*, a common summer visitor to our streams and ponds. The heavy rains in July and the early part of August of the present year brought an unusual number of Common Snipes, Peewits, a few Curlews, and some Teal up our river valley; and two Spotted Crakes, *Crex porzana*, an uncommon species with us, were shot by Mr. Hunt on August 19th in the meadow in which he killed the Great Snipe yesterday.—LILFORD (Lilford Hall, Oundle).

NIDIFICATION OF THE REED WARBLER.—Mr. Seebohm's remarks on the Reed and Marsh Warblers, in last month's 'Zoologist' (p. 377) suggest to me that the following notes on the nesting of the former species may be

interesting to ornithologists. Just outside the borough of Leeds, and in close proximity to the banks of a canal, the smell of whose water is very offensive to the olfactory nerves, is a small narrow willow garth, separated from the towing-path for its entire length by an open drain, about four feet in width, which carries the sewage of two extensive townships, and the odour from which is simply pestilential and pervades the entire plantation. The willows are planted very close together, and are tall and slender, the undergrowth being almost entirely rank nettles. Here, taking into consideration the extent of the place, the Reed Warbler is abundant, though as a Yorkshire bird it must be considered both rare and local. On the 12th or 13th of June last I found seven nests of this bird, containing eggs, in a few minutes; four of these were in the willows, being placed against the slender bole and supported by having two or three twigs passing through their structure. The minimum height from the ground of the nests so placed was five feet, the maximum seven feet six inches. Other nests were hidden among the nettles and supported by their stems and dead twigs of the willows. One nest was sustained by three nettle-stems. These nests were about two feet from the ground. The nests were typical in structure and composition, but I noticed that some of them were spangled with a whitish vegetable skin, probably obtained from the willow-buds. The eggs were mostly four in number, in one instance five, and the contents of two of the nests were exactly similar to the eggs of the Marsh Warbler described by Mr. Seebohm, the ground colour being white with markings, principally at the larger end, and of a clear greenish grey tint of varying intensity. These eggs were so very unlike the ordinary type, and at the same time so different to those of any other bird that I remarked to the friend who accompanied me that had it not been for the fact of our having seen them in the nest it would have been an impossibility to have assigned them to any species known to us.—W. EAGLE CLARKE (5, East View, Hyde Park, Leeds).

NESTING OF MONTAGU'S HARRIER.—In reply to Capt. Hadfield's remarks upon my note on the nesting of Montagu's Harrier near York, I may observe that the egg has been examined by some of our best Yorkshire ornithologists, and they pronounce it to be undoubtedly the egg of *Circus Montagui*. I have a fine series of Harrier's eggs in my collection, and I invariably find that there are three distinct sizes. Those of the Marsh Harrier are largest, then come those of the Hen Harrier, the smallest being those of Montagu's Harrier. Now the egg in question is a little smaller than several of my Montagu's Harrier eggs; it is too small for that of the Hen Harrier, though in the case of Harriers, Owls, Ducks, &c., the best way of identifying the eggs is by obtaining the bird. Mr. Widdas's description of the bird is that of a female *Circus Montagui*. In this part of Yorkshire the Hen

Harrier is quite as rare as either Montagu's or the Marsh Harrier. With regard to the nest being composed of different materials to the one found by Mr. Howard Saunders in the Isle of Wight, I think that may be easily accounted for: perhaps heath and ferns were more easily obtained on the downs where Mr. Saunders found his nest; and with regard to the one described by me, which was found on marshy ground, it is very probable that rushes and other aquatic plants were to be obtained more easily than heath and ferns. I think I am right in saying that the nest of Montagu's Harrier is found built above the ground as often as that of the Hen Harrier. In several works I have by me it is stated that the nests of both species are sometimes found in or near whin bushes. The reason Mr. Widdas took the single egg, thus causing the bird to forsake the nest, was on account of the gamekeeper, who destroys all hawks and hawks' nests and eggs whenever he meets with them. I only know of one other instance of this Harrier breeding in Yorkshire, and that is recorded by Mr. Butterfield in 'The Zoologist' for 1879 (p. 220). I am always very careful not to jump to conclusions hastily, but I think I may safely say it was Montagu's Harrier that bred at Stockton-on-Forest, and not the Hen Harrier, as conjectured by Capt. Hadfield. Since replying as above to Capt. Hadfield's remarks, I have seen Mr. Widdas, who says that "neither moss nor hair was included in the materials used for building the nest." On referring to my note-book I find that moss and hair are mentioned, but this must be a mistake, as the only materials used were rushes, flags, grass, &c.—WALTER RAINE (Leeds).

ON THE CRY OF THE WHITE OWL.—The interesting observations by the Rev. A. Matthews on the cry of the White Owls so exactly agree with mine that I should like to add my testimony to his, as regards the improbability of this bird ever hooting like the Brown Owl. In my boyhood I had quite as good opportunities as Mr. Matthews for becoming familiar with the cry of the White Owl, for when residing at Castle Warren, Co. Cork, where these Owls were common, a pair bred every season in a disused chimney of the old castle part of the building, and the only call ever heard from the old birds was the loud discordant screech emitted by them when in flight, as well as when seen standing on the chimney or other parts of the building. Since I have come to reside in this part of the country, where the White Owl is also common, building in the old ruins of Castlecommor and of the Abbeys of Roserk and Moyne, it has come under my notice every season, and is frequently seen here in the summer evenings beating about the lawn, yet we have never heard any call proceeding from these birds save the usual harsh-sounding screech. As additional evidence against the probability of the White Owl hooting (at least, in Ireland), I may give the experience of my friend Capt. W. K. Dover, of Myrtle Grove, Keswick, who was well acquainted with the Brown Owl in its native haunts

in Cumberland, and so familiar with its cry that he has got it to reply to his good imitation of its hooting; yet, during his long residence in various parts of Ireland, has never heard any sound proceeding from White Owls at all resembling the well-known and peculiar "hoot" of the Brown Owl. In conclusion, I may remark that if White Owls were capable of hooting, such a very peculiar cry would at once attract the attention of observers in those localities where nothing but the "screech" of the White and the "moan" of the Long-eared Owls had previously been known.—ROBERT WARREN (Moyview, Ballina).

AVERAGE DATE OF ARRIVAL OF THE CUCKOO IN ENGLAND.—In your notice of the recent number of Prof. Newton's edition of Yarrell's 'British Birds,' you quote a foot-note, from p. 389, in which Prof. Newton, with his usual caution, speaks of the reported early arrivals of the Cuckoo in this country as to be received with "suspicion, if not incredulity." He then refers to a communication to 'The Zoologist' (p. 3115), in which Mr. Harper says that a Cuckoo's egg was taken in Norfolk on April 5th, 1851. I have not 'The Zoologist' at hand, but in a similar communication to Morris's 'Naturalist' (vol. i., p. 91), Mr. Harper does not claim to have seen the egg in question, but merely remarks that "a lad living in the hamlet of Lakenham obtained from the nest of a Hedge Accentor the egg of a Cuckoo"—a statement which he fails to support by any observation of his own, and which, without further particulars, I for one should be inclined to accept with "suspicion, if not incredulity." As Mr. Harper killed the Cuckoo with the egg in its mouth on the 14th of this same month and year, it may be worth stating that the earliest date under the head "Cuckoo sings" in the "Indications of Spring" kept by the Marsham family at Stratton Strawless, also near this city, occurs in the year 1752, *viz.*, April 9th; the latest being May 9th, in the years 1767 and 1769; and the mean of 112 years, April 23rd. The date for the year in question (1851) is April 22nd.—THOMAS SOUTHWELL (Norwich).

SPOTTED WOODPECKER NEAR BANBURY.—I am pleased to say that there is very little doubt but that both *Picus major* and *P. minor* have bred in this district this season. On July 17th an immature specimen of the former (a female) was shot at Overthorpe, Northants, and on the 22nd of the same month an immature male at Farnborough, Warwickshire. *P. minor*, also a bird of the year, was killed at Bodicote on the 2nd. It is to be regretted that these were destroyed, but the rest of the hatches may have escaped. One or two of the latter are generally seen in this parish in the course of the year.—OLIVER V. APLIN (Bodicote, near Banbury).

[We do not regard the fact of young birds having been shot towards the end of July as affording proof of their having been bred in the neighbourhood where they were obtained.—ED.]

PIED FLYCATCHER AT THE LIZARD.—On September 8th I saw a Pied Flycatcher, *Muscicapa atricapilla*, which at once arrested my attention, and after a short time I succeeded in shooting it. On the 10th I killed another, a very good specimen. I have sent both to Mr. Vingoe, of Penzance, for preservation. Rodd, in his 'Birds of Cornwall,' p. 26, says:—"It first came under my notice in 1849, when one was captured in the autumn at Alverton, Penzance. Since then others have been met with at Scilly also during the winter months. It is here included only as a rare autumn straggler."—HERBERT PASSINGHAM-HART (Polbrean, The Lizard).

THE DEPARTING SWALLOWS.—German newspapers remark that the migratory birds have this year commenced their journey southwards earlier than usual. An old German proverb assigns the 8th of September for the beginning of the Swallow's exit. But already, by August 10th, it was observed all over North-Western Germany that those of the House Swallows whose broods were fully fledged were visibly preparing for their flight; most of the other Swallows had already preceded them. On August 24th a large flock of Storks coming from the north-west arrived in Berlin, visibly tired by a long flight, and continued their journey towards the south-east.—*Norwich Mercury* (September 8th).

DIPPER RETURNING TO ITS OLD NEST.—In 'The Zoologist' for last month (p. 406) is a note on the Dipper returning two years in succession to the same nest. Would Mr. Jesse allow me to inform him that in North-West Yorkshire, where the Dipper is common on most of our mountain streams, it is not unusual for the Dipper to return year after year to the same nest? I have been informed of a pair that have repaired and made use of the same nest for many years in succession. So attached is this bird to some favourite spots that it will return to the same nest even if its eggs or young are taken. I have also found this to be the case with the Kingfisher. Mr. Roberts, of Scarborough, gives an account of a Kingfisher returning to its nest after being robbed of its eggs three times in succession in one season ('Naturalist,' 1880, p. 154). In fact, a great many birds, if not disturbed, will return year after year to repair their old nests and rear their young.—WALTER RAINE (Leeds).

EARLY ARRIVAL OF WIDGEON IN THE MOY ESTUARY.—On the 2nd September, when going to Bartragh with some friends, we observed a little flock of seven or eight Widgeon, and on the 6th upwards of twenty were seen. This is an unusually early date for the appearance of Widgeon in this locality.—ROBERT WARREN (Moyview, Ballina).

LESSER GREY MULLET ON THE NORTHUMBERLAND COAST.—By the kindness of Mr. J. de Camborne Paynter I have received a fish, in a gutted

and salted condition, captured at Alnmouth, on the Northumberland coast, which is undoubtedly a *Mugil*, and which I judge to be the Lesser Grey Mullet, *Mugil chelo* of Yarrell and Couch. It was unknown to the local fishermen. It is twenty inches over all, and sixteen inches from eye to fork, but I cannot give any other measurements. It agrees in all its remaining aspects with the description given by Yarrell, except in the following:—The nostrils in my specimen are wide apart. The anal fin appears to have only one spinous ray, instead of three; the caudal appears to have eighteen rays, instead of sixteen. There is in my specimen a hard leathery double tubercle in the palate without teeth, which may have become fleshy and hardened by the process of salting. I do not recollect having ever seen this Mullet before, and certainly never of such a size; but its principal features of breadth of head, dentition, peculiarities of its superior maxillary bone, size of scale, and arrangement of seven marked horizontal lines along its sides, make me believe very strongly that I am not mistaken in my identification. — THOMAS CORNISH (Prussia Cove, Marazion).

THE MAIGRE, OR SHADE-FISH, OFF THE DEVONSHIRE COAST.— I received a specimen of this rare fish on August 30th from a fish-merchant at Beer, it having been taken by the Beer fishermen in a pollack-net. It measured 2 feet $8\frac{1}{4}$ inches in length, and 1 foot $4\frac{3}{4}$ inches in girth over the pectoral fins. The colour was plain grey, and the general appearance was very much like that of a Bass. On dissection I could find no trace of the small hand-like appendages which usually fringe the thick leathery swimming-bladder. The stomach was empty. There were a number of finger-like appendages. The gill-covers were very slightly serrated. The anterior pharyngeal bones were armed with conical scabrid projections in two rows. This is the second specimen I have had an opportunity of examining. The first was taken off Teignmouth in a pilchard-seine on October 3rd, 1872, and measured 5 feet and $\frac{1}{2}$ an inch in length, and 2 feet 10 inches in girth over the pectoral fins. Its weight was 74 lbs. Adhering to the scales I found several specimens of the Holibut Leech, *Entobdella hippoglossi*. In its stomach were six Monkfish (each about a foot in length), six small Pilchards, and a small Sole. Some of the flesh was cooked and found very palatable, much resembling Mackarel in flavour.—W. S. M. D'URBAN (Albert Memorial Museum, Exeter).

ECKSTROM'S TOPKNOT AND COUCH'S ERYTHRINUS ON THE CORNWALL COAST.—On August 26th in Pra Sand, on "splatty" ground (*i. e.*, ground of which the base is sand, over which are scattered numerous detached rocks covered with sea-weed), I took a specimen of Eckstrom's Topknot, *Rhombus cardina*, I believe the first recorded as captured in Mount's Bay. As it was alive when taken, I am able to say that the gape is not wide, as

asserted by Couch ('British Fishes,' vol. iii. p. 175), who may have been misled by some relaxation of the muscles caused by death. The mouth, in fact, is a small one. At the same time and place I took a small specimen of Couch's Erythrinus, *Pagellus erythrinus*. I shall be glad of correction if I am wrong, but the more I see of this fish the more convinced I am that it and Couch's Spanish Bream ('British Fishes,' vol. i. p. 235) are the same species in different stages of growth. There is much more difference between a Chad (or young Bream) and a full-grown Bream than there is between *Erythrinus* and the Spanish Bream as figured by Couch, and as seen by me.—THOMAS CORNISH (Prussia Cove, Marazion).

PROCEEDINGS OF SCIENTIFIC SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.

July 7, 1880.—J. W. DUNNING, M.A., F.L.S., Vice-President, in the chair.

Mr. Jenner Weir exhibited, on behalf of Mr. J. W. Douglas, a worn female specimen of *Noctua C-nigrum*, which had been taken on June 27th.

Mr. M'Lachlan exhibited a piece of sugar-cane from Queensland much damaged by some Lepidopterous larva, of which specimens were also exhibited. Without having the moth, it would be impossible to decide with any certainty as to the species; but, judging from the larva, he was inclined to believe that it was a species of *Pyralis*. On consulting with Miss Ormerod, he had come to the conclusion that the species was not the same as the "cane-borer" from British Guiana.

Mr. W. I. Distant said that he was acquainted with the "cane-borer" from Madras, and that it was not the same species as that described by Guiling.

Mr. W. F. Kirby called attention to the description and figure of *Pyralis saccharalis*, Fabr., published in 'Skifter af Naturhistorie Selskabet,' vol. iii. part 2 (1794), pp. 63–65, pl. vii. fig. 1, where the insect is represented in all stages. He also referred to the long account of the insect given by Guénée in Maillard's 'Notes sur l'Ile de Réunion,' Lép., pp. 68–71. Guénée considers the insect to be allied to *Schœnobia*, and calls it *Borer* (!) *saccharellus*. Fortunately this generic name will not stand, as Guiling's name of *Diatræa* has the priority.

Miss E. A. Ormerod exhibited specimens of *Tomarus bituberculatus*, *Sphenophorus sacchari* (with cocoon), and *Rhyncophorus* (?) *palmarum*, cocoons and pupa), and read the following note on "Cane-borers":—

"In the course of last autumn it was mentioned to me that, in addition to the species of cane-borer previously noticed, another kind (which was

incidentally mentioned to be a *Macraspis*) was doing much harm in Berbice. On examination of the specimens, however (now exhibited), the beetle turned out to be one of the Dynastidæ, *Tomarus bituberculatus*, and any suggestion for diminishing the numbers would be very acceptable. The beetle, which is one of the kinds popularly known as 'hardbacks' in the colony, is enormously plentiful, coming into the houses in the evening in such quantities as to require to be swept from the tables, and I am informed by a naturalist lately resident in Guiana that as many as five specimens may be found in the unopened flower-buds of the *Victoria Regia*.

"The other specimens exhibited are of *Sphenophorus sacchari*, with its cocoon, and also two cocoons (one opened to show the contained pupa) of a larger species of *Rhyncophorus*, but I conjecture not of *Rhyncophorus palmarum*. In the course of investigation last year it appeared that there were more species at work than was at first supposed. One of these, kindly lent me for examination by the Colonial Company, much resembles *R. palmarum*, but is smaller, and, after careful search and comparison of specimens,—in which I was kindly assisted at the British Museum,—appears to be undescribed. It is very like *R. Zimmermanni*, but is not identical. A very few specimens, bred by Mr. D'Urban, of Exeter, from imported canes, appear to be of yet another species, but I only know these by report.

"Larvæ of the large *Rhyncophorus*, and of the *Sphenophorus sacchari*, have been exhibited before; but I show them now relatively to a peculiar formation frequently noticeable in the larger grub,—of which some lumps will be noticed at the bottom of the bottle (this is whitish and hard when in the grub preserved in spirits),—and I benefit by the examination kindly made of it by Mr. Meldola to mention that it is of the nature of a true wax, and may be derived from *cerosin*, a natural wax found in sugar-cane, investigated by Avequin and Dumas, and here conjecturally altered by the digestive processes. The taste of this secretion (which perhaps I should mention was, after some preliminaries, *my* part of the experiment) was exceedingly sweet, and throws some light on the fondness of the natives, and also in some cases of the residents, for these grubs, as matter of food. I am informed they are partaken of fried or 'plain boiled,' and all mashed up together, and as many as 120 are eaten at a sitting! As this formation of sugar melts at a very low temperature, probably the operation of cooking disperses its sweetness through the mass; nevertheless the dish appears somewhat uninviting.

"To return, however, to the attacks of the cane-borer in Demerara; these were lessened for a time, but are still in action to a much greater extent than could be wished. Many experiments have been tried, and amongst others it is noted with regard to powers of endurance that it required 10 parts of sulphuric acid to 100 of water to kill the small borer

(*Proceras*), and 30 parts acid to 100 of water to kill the large kind—locally the ‘tácuma,’ scientifically the *Rhyncophorus*. The application of chemicals is, however, scarcely practicable. From the size and extent of the crop, and the fact of the borers being inside when at work, it is very hard to get at them, but nevertheless systematic care seems to be doing something.

“The points that appear especially to be attended to beneficially are, first, with regard to what are termed ‘tops,’ that is, the long pieces of cane-cuttings put in to form the new plants. These are carefully watched, and, if symptoms of the borer appears, are removed. Another point is cutting out infested pieces from the crop-plants; in this way the insect presence is diminished, and by putting the removed cane through the mills enough is got from it to pay expenses. Attention is also directed to destroying refuse cane, which otherwise would accumulate, and, by attracting borers, form centres for new hordes to come out from.

“These points are all of great importance, and can be worked practically; but for the constant watch on the borers necessary to keep them down, it seems that the only sure protection lies in encouragement of their natural enemies, and especially the ants, which form a kind of insect police, constantly and very efficiently on the look-out.

“After discussion of the subject last year (following on the very judicious suggestions of some of the residents in the colony), the Colonial Company issued orders that no more ants’ nests should be burned. These natural protectors require some special care themselves, as, in addition to the clearing of their nests by fire in process of cultivation, it is a custom to burn them in order to drive away mosquitoes by the peculiarly pungent and unpleasant smell thus produced.

“This protection, it may be hoped, will bring the average ant presence up to the previous amount, for there seems no doubt of their usefulness. I am informed by various residents (with whom I have been in communication whilst they were in England) that when unchecked these ants are immensely numerous; to be found in nests at the foot of the cane, and also on the canes; and that if some pieces of the cane are thrown down ants will directly be seen streaming to them from all quarters; and in this way they are always at hand to attack the eggs or young grubs before they have made their way into the cane, or again on their exit from it before going into the pupal state. They appear to me the only check applicable to the cane-borer moth, *Proceras sacchariphagus*, in its imago form, in which, from the observations made in Mauritius, it appears to be remarkable for its sedentary habits, remaining motionless for a large portion of its short life in the shelter of the leaves.

“The life-history of the moth has been already given by various writers, but there is so much of interest in the very long notes of it given by Mr. W. Bojer, the President of the Committee appointed by the Governor

of the Island of Mauritius to investigate the subject and suggest a remedy, in the autumn of 1848, on the first outburst of the alarm, when the moth was found to have fairly made good its footing in Mauritius, that, as the original documents are somewhat difficult of access, and the numbers of the 'Sugar-Cane' and the 'Royal Gazette,' in which they are reprinted, appear to be almost equally so, I venture to give some points from the Report.

"It appears that the presence of this moth was not known in Mauritius, either by any planter, or by any naturalist familiar with the local Entomology, until November, 1848, when, with a view to regenerate the canes of the islands (then diseased in another way), a quantity of new canes were sent for from Ceylon. Before the arrival of these canes a report was circulated that Cingalese canes were infested by a borer. On their arrival examination was made by a Committee appointed for the purpose, and almost all these newly-imported canes were found to be perforated by the moth cane-borer. The immediate destruction of the canes was recommended, but it is conjectured that some left temporarily in an accessible spot were carried off and planted, for two years afterwards the moth made its appearance.

"The notes from Mauritius agree with most of those from British Guiana as to the moth-egg being laid on the cane-leaves; the caterpillar feeding in the cane, and subsequently coming out again and turning to pupa in a slight web amongst the leaves. The eggs are stated to be transparent, their greenish colour making them difficult of observation on the cane-leaf; their shape is depressed and oval; their longest diameter is stated to be the third of a line.

"The only moth observed in the act of oviposition deposited 162 eggs, which were placed in two parallel rows and hatched on the ninth day. Their extreme transparency allowed of observations of the development of the caterpillar in the egg. On the second day an opaque line was noticed, indicating the first appearance of the digestive organs. On the next day a small black point at one extremity of the line indicated the future head; later the body of the insect became more apparent; movement became visible, and its position is stated to have been coiled on itself with the head in the centre. The length of the caterpillar on coming out of the egg on the ninth day is given as $1\frac{1}{4}$ line.

"When the caterpillar has reached full development, which is at the end of about thirty-one days, it is 12 to 14 lines in length, and its movement is described as being very quick in either direction, whether forward or backward. The head is depressed, furnished with strong toothed jaws, and with a plate of a paler colour. The labrum is said to have a very hard lance-shaped termination, which helps it to perforate the cane.

"Each segment has four black glands in a longitudinal row on each side of the back marked by a pink band. On the lateral sides are also seen eight black points surrounded by glands of the same colour, united

also by a pink band.' These points are the breathing pores. The glands are usually terminated by bristles.

"The caterpillar changes its skin five times before metamorphosis, and when about to turn it leaves the inside of the cane and lightly spins a few of the leaves together for a protection. The caterpillars that from any cause remain to undergo pupation in the cane appear usually to perish from the humidity and unsuitableness of position, or from *Acari*. Several hundred chrysalides taken from inside cane were found on inspection to contain *Acari* instead of the future moth.

"The existence of the insect is computed at nine days in the egg, thirty-one as a caterpillar, fifteen as a chrysalis, and four or five in the imago state—about sixty days altogether; and as in the mildness of the Mauritian climate reproduction takes place at all seasons, the increase is very rapid.

"Details regarding these small moths have been so fully given elsewhere that I need not enter on their specific description, but their appearance when in repose is stated to be very singular. The inferior palpi are stated to be nearly three times the length of the head, projecting forward in the shape of a beak. The anterior legs are without spines, and when the moth is at rest are directed forward parallel to the beak-like palpi, and in addition to the great black eyes which distinguish this moth, and the antennæ laid flat against the wings, which they exceed in length (but which are raised at a right angle when on the point of flying), are remarked as giving the insect 'a very peculiar, not to say sinister look.'

"From observations made on the moth in captivity, it is stated to be very sedentary in its habits, remaining fixed in the same place for thirty-six hours concealed between leaves without even changing its position. Its flight is heavy and almost vertical; but when tormented at night by a vivid light, it jumps and turns on itself very quickly, and if set at liberty—far from being attracted by the light of a candle—conceals itself in the darkest corner of the room. The writer observes, 'This peculiarity has confirmed us in our first impression that its large eyes are totally deprived of the choroid membrane, which renders it almost blind.' It is also noted that the moth had not then been captured in the cane-fields—conjecturally from its remaining hidden under the leaves.

"The report quoted runs to considerable length, but I have given these few points as they seem of practical importance.

"The habits as mentioned agree with those noted of the moth cane-borer from Demerara, even in the matter of difficulty of capture, and this quiescent state in the shelter of the leaves and immediate concealment on disturbance, puts it on the one hand almost *out* of reach of destruction by the usual artificial means of attraction; and, on the other hand, puts it very much *into* the power of the ants, stealing quietly into every nook to lay hold of and destroy it.

"Effects of weather and state of health of the plants appear to act strongly on the borers generally, the attacks being noted as worst in seasons of drought; this, apparently (as with some of our English attacks), from the dry weather, and state of the plant-juices being favourable to the insects, and also from the plants not being able to make way against them, or 'grow past,' as it is termed.

"This point is worth notice, relatively to what may be found to answer from increased irrigation or anything keeping up the vigour of the plant as stimulant application; and I may observe that in an experiment instituted with regard to the effects of the mixture known as 'Soluble Phenyle,' this was applied in diluted form with ash of the burnt canes, and whether from the ash or the 'phenyle,' or both, a growth was reported of a remarkably healthy green, and although the difference in amount of insect presence accompanying was not great, it was certainly less."

Mr. W. L. Distant stated that he had had some experience in sugar-cane growing in Malacca, and he was of opinion that the remedy for exterminating the borers lay with the planters themselves. The necessity was to burn all the refuse "trash" from the canes, as was done on the largest estates, and not allow such to accumulate, as frequently took place on badly managed plantations. He had only that day been discussing the matter with a large cocoa-nut palm grower of Malacca. That palm suffers severely from the depredations of two beetles, *Xylotrupes gideon* and *Oryctes rhinoceros*, and the principal defence is to prevent the accumulation of vegetable refuse. Frequently Chinamen who had adjoining plantations would allow "paddy" husk, or sawdust, to accumulate, thus affording breeding grounds for these destructive insects, to the injury of all the surrounding estates.

Miss Ormerod stated that the planters in British Guiana had now become aware of the importance of not allowing refuse to accumulate.

Mr. M'Lachlan was of opinion that the cane-borers could be entirely exterminated by weeding out and burning the canes as soon as they showed any symptoms of being infested.

Mr. W. L. Distant exhibited a specimen of the so-called "vegetable caterpillar" from New Zealand, procured for him by Dr. Dunkley. This is the larva of a moth, *Hepialus rivescens*, on which the spores of *Cordyceps* (*Spharia*) *Robertsii* frequently fall, becoming truly vegetable parasites, destroying the caterpillars, and growing therefrom in the form which has caused so many erroneous statements to be made. This caterpillar feeds on the *Convolvulus* (native potato).

Mr. T. R. Billups exhibited a larva of *Plusia chrysitis* and some specimens of an Ichneumon that infested it. He stated that 120 of the Ichneumons had emerged, and that he had identified them as a species of *Pachylloma*.

Mr. A. Phipson exhibited a remarkable variety of *Pyrameis cardui* taken near Basingstoke last August. (See fig.)



The Secretary then read a note by Mr. Sidney Churchill, of Teheran, on *Argas Persicus*.

Mr. R. Trimen communicated notes "On the pairing of a Butterfly with a Moth in Natal" and "On a supposed female of *Dorylus helvolicus* (Linn.)."

Messrs. F. Du Cane Godman and Osbert Salvin communicated "A List of Diurnal Lepidoptera collected in the Sierra Nevada of Santa Marta, Colombia, and the vicinity."

August 4, 1880.—J. W. DUNNING, M.A., F.L.S., Vice-President, in the chair.

Sir Sidney Saunders forwarded for exhibition four living specimens of *Prosopis rubicola*, all stylopized females recently bred from larvae extracted from briars received from Epirus, each of these small beetles bearing the projecting puparium of a male *Hylechthrus*, and in one instance two of the latter, and communicated some notes thereon.

Miss E. A. Ormerod exhibited a soft, fleshy gall-like formation found on *Rhododendron ferrugineum* at Merton, and believed by Dr. Thomas to be a fungoid growth.

Mr. Fitch stated he had often possessed specimens of this supposed gall, and had attempted in vain to breed an insect from them; he was therefore disposed to concur in Dr. Thomas's view.

Mr. T. R. Billups exhibited a specimen of *Heptaulacus villosus* from Box Hill.

Mr. C. O. Waterhouse stated that about five years ago he had taken from forty to fifty specimens of this rare beetle in a chalk-pit in Freshwater Bay.

Mr. H. J. Elwes communicated a paper "On the Genus *Colias*," and Mr. W. L. Distant read a paper entitled "Notes on Exotic *Rhynchota*, with descriptions of new species."—R. MELDOLA, Hon. Secretary.

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A VISIT TO THE COLONY OF SPOONBILLS NEAR AMSTERDAM.

BY HENRY SEEBOHN, F.Z.S.

IN 'The Ibis' for 1877, Dr. Sclater and Mr. Forbes, the Secretary and Prosector of the Zoological Society of London, wrote a most interesting account of their visit to the Horster Meer, between Amsterdam and Utrecht, and strongly advised their brother ornithologists, who should be travelling in Holland, by no means to miss seeing the nesting-place of the Spoonbills. In the spring of the present year Capt. Elwes and I spent some time in Jutland, and on our return journey we went out of our way to follow the advice of Dr. Sclater, and were so much interested in what we saw that I can only recommend all readers of 'The Zoologist' who are interested in bird-nesting to go and do likewise. I have seen many breeding colonies of birds in various parts of the world, but seldom one which interested me more than the one concerning which I extract a few notes from my journal.

When I was in Amsterdam last year with Dr. Sclater, he introduced me to M. Westermann, the Director, and to M. Hegt, the Assistant-Director, of the excellent Zoological Gardens of that city. Immediately on our arrival in Amsterdam we visited the Gardens, and expressed our wish to the gentlemen I have named to visit Horster Meer. With the kindness which I have invariably received from all continental ornithologists, they not only gave us every information we required, but provided us with a guide, whose local knowledge of Botany and Zoology largely

added to the interest of the trip. We travelled by rail from Amsterdam to Hilversum, passing at first through a district of low meadow country intersected by dykes, and afterwards across somewhat more elevated land, for the most part barren sandy heath. The date was the 23rd of May; the day was uninterrupted brilliant sunshine, but a stiff breeze was blowing, which naturally had the effect of making large birds wild on the wing, and of causing small birds to skulk in the shelter of the alders and willows.

Hilversum is the Tivoli of Amsterdam; and we drove for a mile or so through a charming country, full of the villas of Amsterdam merchants, nestled in beech and oak woods, and surrounded by garden-plots, gay with flowers and shrubs, but whose beauty in English eyes was somewhat marred by the regulation white statues of the country. An hour's drive brought us out of the woods and gardens to an immense plain, stretching away on each side of the road almost as far as the eye could reach; lakes, swamps, marshes, and willow-beds, intersected by a river, and, in places where the ground was firm enough for pasture, with dykes. Passing through several straggling villages, the inhabitants of which seemed to be principally occupied in peeling willow, to be afterwards woven into baskets, and mending fishing-nets, we travelled for some distance alongside the River Vecht. The second hour's drive with a good horse brought us to Overmeer-an-de-Vecht, a small village close to the Horster Meer, the lake on whose shores the Spoonbills were reported to breed.

Our guide conducted us to the house where Mynheer Van Dyk, the lessee of the Horster Meer used to reside. Here we learned that he was no longer living, but we discovered the new lessee, sitting on the ground, smoking his pipe and mending his nets. He informed us that he pays a rent of about £420 a-year for the Meer, which probably includes the annual crop of willow-twigs, the fishing, and the winter's shooting, together with the eggs. The man who was employed to collect the eggs was absent, but he volunteered to take us in his boat to the Meer, and to try and find the breeding-place for us, which, strange to say, he had evidently never visited, at least during this season. We rowed for a short distance between willow-beds until the dyke became too narrow for oars, when our new friend the lessee jumped on to the bank and towed us along for some distance. At first we were

disappointed not to see a crowd of birds. Occasionally we saw a Black Tern or a Cormorant, and at length had the pleasure of seeing two pairs of Spoonbills. On landing we found ourselves on marshy ground, thickly overgrown with reeds and *Carices*, amongst which were growing two rare species of British ferns, *Lastræa thelipteris*, abundantly, and *Lastræa cristata*, sparingly. The ground was also diversified with a considerable variety of wild flowers, such as marsh mallow, ragged robin, &c. For some distance we passed amongst alder- and willow-bushes, but beyond was open ground leading to the Meer. In our ignorance we made for this open ground, disturbing a large flock of perhaps five hundred Cormorants. We could see their nests in the distance, but passed them by in pursuit of the Spoonbills.

Suddenly we came upon the object of our search. A flock of at least two or three hundred of these curious birds rose behind the alder-bushes, their white wings glittering in the sun, in strong contrast to their black legs stretched out behind, and their dark bills projecting so conspicuously in front. For some time they flew about like the Gannets at the Bass Rock, but we detected no cry from them; indeed, they seem to be remarkably silent birds.* We made for the direction from which they rose, keeping to the open ground, and looking in vain for the nests, being misled by our guide, who was evidently entirely ignorant of their breeding haunts, though living almost within gunshot of them. We carefully searched the ground as near to the Meer as we could go without actually wading, until we had long passed the place from which the flock must have risen. Finding nothing we turned our backs upon our guide and returned to the alder-bushes. Here we came upon three nests; one that of a Spoonbill on a grassy tussock, containing one egg; the second that of a Purple Heron, about four feet from the ground, containing two eggs; and the third another Spoonbill's nest, with one egg, in a similar situation to that of the Heron. All these nests were alike—a few sticks outside, a principal structure of reeds, and a lining of dead grass.

* Since writing the above, Mr. Harting has called my attention to a notice of the peculiar formation of the vocal organs of the Spoonbill (Yarrell, Hist. Brit. Birds, ed. 3, vol. ii., p. 602), where it is stated, "This bird is one of the very few which has been found to possess no true muscles of the organs of voice, and no modulation of its single tone appears to be possessed by the bird."

Passing on, still in the alder plantations, we came to the place from whence the flock must have risen when we first came to the locality; and we were not long in finding the main colony, which consisted of perhaps fifty nests. Nearly all of them were on the ground, and within a radius of some twenty yards. Some contained one egg, others two, for they had probably all been robbed on the Saturday previous to our visit. Most of the nests were on grassy tussocks, but a few were in the alder trees; and the effluvium from the droppings of the birds was so strong that we should have discovered the locality at once had not a strong gale been blowing all the day. Upon our invasion of their nesting-place most of the birds flew right away, but small parties of five or six were always on the wing near at hand. Their powerful heron-like wings enabled them to sail along for considerable distances without much exertion; and I noticed that they had a habit of dropping their legs occasionally, probably to assist them in keeping their balance in the high wind. We selected a fine series of eggs, and then turned our attention to the hitherto neglected Cormorants.

This colony was on the open ground near the lake. As we approached we occasionally found a few outlying nests, built in the willow-bushes which were here and there growing in the marsh. The main colony was an interesting sight. A bare piece of ground, with a radius of not more than six or seven yards, contained two hundred nests, in many places touching each other. The nests were piles of sticks and reeds from one to four feet high, and lined with a small quantity of fresh grass. Every year it would seem that a new nest was built upon the remains of the old one, and the locality has apparently been occupied for many years. All traces of vegetation has long ago been burnt off by the superabundance of manure; the ground and the sides of the nests were white with the droppings of the birds, and scattered here and there were fishes, some half-a-pound in weight, and in various stages of decomposition. Most of the nests were empty, perhaps fifty of them containing one egg each. When we first came up the birds were on the nests, and the place was black with them; but as we approached they rose, and, after flying round for some little time, alighted on the lake. We counted the nests, selected a few eggs, and made notes on the interesting scene, during which time we were occasionally visited

by detachments of Cormorants, who came to watch our movements, and then return to the main flock on the lake. The day was very unfavourable for small birds; but we heard the Cuckoo, Sedge Warbler, Chiffchaff, and Willow Wren, besides seeing Starlings, Jackdaws, Magpies, and Sparrows.

The eggs of the Spoonbill varied much in size, shape and colour. Some were long and narrow, with the small end almost as blunt as the large end, and scarcely varied in shape from the typical eggs of the Cormorant. Others, again, were so round that they might easily have been passed off by unprincipled dealers as eggs of the Kite. Many were scarcely spotted at all; in others the whole surface was evenly, but somewhat sparingly, sprinkled over with chestnut-brown spots; whilst in others the spots were accumulated in a zone round the large end, and frequently confluent. In one nest I picked up a small egg, almost round, not much larger than that of a Little Owl. As was to be expected, when I came to blow it I found that it contained no yoke.

NOTES ON THE FRESH-WATER FISHES OF INDIA.

BY FRANCIS DAY, F.L.S.

(Continued from p. 437.)

THE common Perch, at half-a-pound weight, has been found to contain 20,000 ova or upwards; at nearly three pounds, 127,240; at over three pounds, 155,620; and in one, the size of which is not mentioned, Picot found nearly 1,000,000. They are about the size of poppy-seeds, glued together by mucus into stringy bands or mesh-work, having much resemblance to frog-spawn. The female selects a spot where rushes, reeds, or grass grow in the water, or else seeks a piece of wood, or some hard substance, against which she rubs herself, or presses until one end of the gelatinous band of ova has become attached, then gently swimming away, the eggs are voided. The Sticklebacks, both marine and fresh-water, form nests for the reception of their eggs, as do many tropical fishes. The siluroids, *Ariinæ*, appear to have a still more difficult task to perform, as the male carries about the large eggs in his mouth until hatched, or it may be that he only removes them from some spot when danger is imminent. However this may be, I have netted many with from fifteen to twenty of the

eggs in their mouth, and one example contained a young fry hatched, but with the yelk-bag still adherent. In none was there any trace of food in the intestines. Lastly, I will allude to the tufted-gilled fishes, represented by the pipe and horse-fishes of the British seas. In them also the males perform the function of hatching the eggs, which for that purpose are deposited up to the time of the evolution of the young between the ventral fins, as in the *Solenostomus*, in tail-pouches as in horse-fishes, or in pouches on the breast and abdomen, as in the pipe-fishes, *Doryrhamphus*, or merely in rows, in the same place as in *Nerophis*.

One very interesting question respecting fish-eggs is whether their germination can be by any means retarded? Great difficulty was experienced some years since when attempting to transmit young fish from Europe to the Antipodes, and it was naturally argued that it would be far better if some means could be devised for transporting the eggs and hatching them subsequent to their arrival. This, it was evident, could not be effected unless their germination could be retarded, or the eggs would be hatched while at sea, where the young would most certainly perish. Count Goldstein in the middle, and Bloch at the end of the last century, made many experiments as to the feasibility of fish being hatched artificially; while the latter also investigated whether it were possible to convey the ova in safety for any considerable distance. He proposed placing the eggs of pond-fish in mud, similar to that existing in the locality from whence the eggs were procured, and he thought that when dry they could be removed without injury from one pond to another. His proposal was originally based on the theory that frequently on dried-up ponds being refilled with water young fish appear, and which could only be due to the eggs having been present in the mud, but with their germination suspended. Yarrell likewise supported this plan being attempted; but, so far as I know, it does not appear to have been yet tried. In India, as ponds or tanks dry up, some of the fish contained therein descend into the mud, where they æstivate until the rains of the succeeding year set in. As these commence and the mud softens, and subsequently liquefies, fish are perceived diverging in all directions up every watercourse, no matter how small, or how lately it may have been quite dry, while in a few days fry are distributed everywhere. Where the eggs do come from which have produced these fry is a very interesting subject of investigation.

Have they remained within the mother fish, and has their germination been retarded so long as she continued in the exsiccated mud? Did she deposit them as soon as the rains set her free? I cannot believe this theory to be tenable; first, because the fish I have seen removed alive from the mud had no ova in them; and secondly, because the fry were so soon hatched after the setting in of the rains, while none of these fishes are ovi-viviparous. It seems more reasonable to suppose that the fertilised eggs are imbedded in the mud, and, as soon as the rains occur, become hatched out; and this would give us reason to believe success might result if this plan were tried with the ova of pond-fishes. Could large numbers of eggs be safely conveyed in dried mud to distant countries, a considerable amount of the present difficulty in their transport would have been overcome. The Bishop of Norwich, at a meeting of the British Association in 1875, "related several facts, showing that the spawn of fishes may be conveyed from one country to another over the sea. He knew an instance in which the ova of the Pike were deposited in the thatch of a cottage, and after having remained there for years, on the thatch being thrown into a dry ditch, which afterwards became filled with rain, young Pike appeared"! (*Annals Nat. Hist.*, 1845, p. 1026). A most valuable discovery was made by Mr. Youle, in 1854, that fertilised Salmon and Trout ova could have their germination retarded by means of ice. He packed the eggs in moss, which was placed in a side wooden box of inch pine, having perforated sides, and these boxes were covered over with ice, by which means the ova were conveyed in safety to the Antipodes, where they were subsequently hatched out.

Although I have no intention of entering upon the interesting subjects involved in the artificial propagation of fish, I think it necessary to remark how—if great cold be employed in retarding germination—excessive warmth may have an opposite and very deleterious effect; and by warmth I do not allude only to that which is present, but to the fact of its being in proportion to what the ova would have retained in their natural habitat. For it cannot be supposed that the amount of heat which is normal to fish-eggs in the tropics is such as might with impunity be applied to those which are naturally hatched within the arctic circle of the limits of Northern Europe. Dr. Davy concluded from his experiments on Salmon ova, that the ova

were capable of bearing a temperature of about 80° or 82° in water for a moderate time with impunity, but not without loss of life at a higher temperature—any exceeding 84° or 85° . The fish which take the longest time to hatch normally are, as a rule, the strongest, and this will be influenced by the temperature of the water, while too much warmth injures the fry. Forty to fifty degrees has been considered best for Trout or Salmon ova, 48° to 50° is as high as is safe; 52° to 55° brings them on too rapidly, while 55° is as high as the fry should be exposed to. During the last half of May and the first half of June, 1866, I made some observations upon the temperature of the Bowany River, at the base of the Neilgherry Hills, in the Madras Presidency, this period being the common breeding season for many species of fish residing there. The temperature at 6 a.m., 79° ; at 12 a.m., 92° ; 4 p.m., 86° ; 6 p.m., 82° . Subsequent to the first burst of the monsoon, which occurred before June 20th, I found it—6 a.m., 70° ; 12 a.m., 79° ; 6 p.m., 78° . In Burma, during June, 1869, I took eighty-five observations as to the heat of the water in the Irrawaddi River; one foot beneath the surface it averaged 83° , and varied from 82° to 85° , whereas in the Een-gay-gyee Lake I found 90° at 11 a.m.

The methods employed to capture the fresh-water fishes in the East are exceedingly numerous, but space will merely permit me to enumerate some few of them. Prior to doing this, I propose shortly adverting to how the fisheries of India and Burma have been and how they are now worked. From the information collected between 1869 and 1873 it appeared that fisheries in olden times were royalties, mostly let out to contractors, who alone in their respective districts possessed the right to sell fish, while they, as a rule, permitted the people, on payment, to capture sufficient for their own households. It was, in fact, a license on payment, resumable at will. Remains of this custom still exist in Lahore, while the leasing of fisheries is even now in force in many portions of the Indian Empire. Along the Himalayas in the Kangra and other districts the petty rajahs adopt a somewhat different method. To some persons they give licenses to supply the fish-markets, of which they virtually made them monopolists, while others obtained licenses for fishing with small nets for home consumption, but not for sale. In Burma, under native rule, a similar plan was carried out. There were no free fisheries; but inhabitants had the privilege—or perhaps right—to fish for home

consumption on the payment of a fixed annual sum to the contractor for the district in which they resided. It is believed that under native rule the erection of fishing weirs was permitted in several of the streams in the Himalayas, but not to the extent that they are at the present day. In some districts landowners even now raise an income from the fisheries, claiming a third of the captures or a certain amount of money. Some of our officials consider that as Government has permitted indiscriminate fishing the exercise of long practice has converted such into a communal right.

As British rule has gradually superseded that of the native princes, so the modes in which fisheries were leased has become widely different, and mostly obsolete. In permanently settled estates, unless a stipulation to the contrary exists, they go with the land. In some localities it has been decided that the adjacent villagers or people possess certain communal rights with respect to them, due, it seems most probable, to a misapprehension. Although it has been proved that the landowner never received more than one-third of the produce, this does not demonstrate that the other two-thirds were public property, but that such expressed the share accruing to the fisherman in return for his labour in capturing the fish. It is the rule in India and Burma to remunerate by the proceeds; sometimes the working fisherman has to dispose of his share to the contractor or lessee at a given rate; more rarely, the fish are sold, and he receives a proportion of the returns, or he may be paid in kind. In some localities the British Government has leased fisheries, or imposed a tax on the implements of fishing, or a capitation tax upon the fishermen, but without interfering with the manner in which the fisheries were conducted. By degrees the tax on fishing implements was taken off, but the fishermen still became poorer, and in 1849—at least in Madras—many leased fisheries were thrown open to the public, eventuating, as they were not regulated, in unlimited license, and thus an intended boon resulted in their depopulation. In Burma the practice of employing fixed engines in irrigated fields and watercourses very largely increased when the native *régime* became abolished, as did also the custom of throwing weirs across creeks and minor streams. If individuals are permitted to help themselves to fish from fisheries as they please,

they will assuredly employ the means which give them the least amount of trouble, and thus the breeding fish and fry fall victims to man's rapacity, unchecked by wholesome enactments. Nor can the fishermen be blamed. The result would be the same in Europe as in the East if the like permission existed.

Free fisheries have been permitted, owing to several causes, such as the difficulty in making them sufficiently remunerative to bear taxation or the incidence of rent, which may be due to the rapidity of the current, the paucity of fish, as in some hill-streams and depopulated rivers, the depths of tanks, the presence of foreign substances in them, or the poverty of the general population. How general and indiscriminate fishing ruins fisheries, without any commensurate benefit accruing to the public I have already pointed out. In these deteriorated but public fisheries, as soon as the monsoon has set in, and the fry are commencing to move about, women and children are daily engaged in searching for them in every sheltered spot where they have retired for security, for, not being able to face strong currents or live in deep waters, they naturally resort to the grassy but inundated borders of rivers and tanks. Every device that can be thought of is now called into use; nets which will not permit a mosquito to pass are employed; even the use of cloths may be frequently observed. Neither are the agricultural population idle. They construct traps of wicker-work, baskets, and nets; these traps permit nothing but water to pass, and a fish once inside is unable to return, as they resemble some of our commoner kinds of rat-traps. So soon as fish, for the purpose of breeding, commence passing up the small watercourses at the sides of rivers and streams, these implements of capture come into use; breeding fish are taken, and the few which surmount the obstructions find the traps reversed, so that, although they have ascended in safety, it is by no means improbable that their return to the river will yet be cut off. In Burma a large triangular-shaped basket is employed in places where trapping is difficult, and a pair of buffaloes having been harnessed to it, it is dragged through the localities inhabited by the fry. Even when there are no restrictions, fishermen often find it advantageous to ply their occupation in concert. Sometimes large bodies of villagers proceed at certain seasons of the year to rivers which can be easily bunded, having done which, they kill every fish they are able.

The fixed engines employed in India and Burma are mainly divisible into two forms—(1) those manufactured of cotton, hemp, aloe-fibre, coir, or some such material; and (2) those constructed of split bamboo, rattan, reed, grass, or some more or less inelastic substance. Those which are manufactured of elastic substances include all stake-nets, but when the meshes are of a fair size they are a legitimate means, when properly employed, for the capture of fish, but are occasionally to be deprecated, especially when used solely to take such as are breeding. But in some of these implements the size of the mesh is so minute that no fish is able to pass. There it stands, immovably fixed across an entire water-way, capturing everything, the water being literally strained through it. The meshes have been described as so minute that a large black ant could not pass, or that they would arrest a tamarind or a mustard-seed; or else they resemble the size of mosquito curtain-nets. In one instance, in the Punjab, a whole drove of Mahaseer were observed to be captured by natives fixing a net across a river, and then dragging another down to it, thus occasioning wholesale destruction, and ruining the rod-fishing for the succeeding season. This plan is a very common procedure throughout India, as is also the construction of earthen dams across streams, leaving a channel or opening through their centre, where a purse-net is fixed, and arrests every descending fish. The largest numbers are taken towards the end of the rainy season, for as the waters fall, countless lakes and pools of all sizes are formed on the low lands in the vicinity of rivers. These, which during the floods were lateral extensions of the stream, now become lakes having one or more narrow outlets into the river; across each opening nets are stretched, or a weir of grass constructed, and every fish which has wandered up becomes a certain prey to the fisherman.

Fixed engines constructed of non-elastic substances are still more destructive to fish than are such as are made of net, and which are more liable to be rent. Their forms are exceedingly numerous, their sizes infinite, while that of the interstices between the substances of which the weirs or traps are composed appear everywhere much the same, whether examined in the ghâts of Canara, the Yomas of Pegu, the Himalayas, or on the plains of India or Burma. Still, local influences must occasion some modifications. In hilly districts, as the monsoon floods subside

and the impetuosity of the mountain torrents decreases, they can be erected without being liable to be washed away. Up the hill-streams (as I have already observed) some of the most valuable of the Carps ascend to breed, and there are now but few that are not weired, and the parent fishes have the greatest difficulty in reaching their spawning grounds. Some, however, surmount the difficulties opposing their ascent, a few deposit their spawn; this completed, the rains are now passing off, the force of the current lessening; and what now occurs to those fishes who commence descending—trying to regain their low-country rivers? I omit in this place how spearing, snatching, or snagging, netting, and angling are carried on, only noticing how fixed engines are employed. Weirs are now erected every few miles through which the waters of the hill-streams are literally strained, while each is fitted with a cruive or fishing-trap. The probabilities are that the great majority of the Mahaseer which reach the rivers of the plains are the last year's fry that have fortunately escaped destruction during the dry months, and with the first floods have obtained a free highway by the standing weirs being swept away. Wicker traps are likewise constructed across convenient rapids; here few fish can pass without entering, while these are examined twice daily. Or, should there be no rapids, such are artificially formed by laying large stones in a V-shape across a stream, while at the apex of this is a trap; or a mountain stream is conducted down a slope over a large concave basket, so that all descending fish are pitched into it, and speedily suffocated by the rushing water or other falling fish, which act like a succession of blows, preventing their ever rising again.

In addition to the larger weirs and traps, there are minor sorts most extensively employed, especially in the plains—some to capture breeding fish ascending up the smaller watercourses during the rains to deposit their spawn; others to arrest them and their fry attempting to descend the stream as the flood-waters recede, and there is not a district, except perhaps in Sind, in which this mode of capture is not carried on; and some officials now speak of the use of these contrivances as communal and prescriptive rights, and their prohibition as an interference with private property!

Movable fishing implements are of two varieties—(1) those manufactured of cotton, hemp, aloe-fibre, coir, or some such

material; and (2) those made of split bamboo, rattan, reed, grass, or other more or less inelastic substances. Large drag-nets, having fairly-sized meshes, are used mostly during the dry months, and employed for the purpose of obtaining fish from pools in rivers into which they have retired awaiting the next year's floods. But the movable nets which occasion the most damage are those with small meshes, and principally employed for taking the fry of the fish as they are first moving about; they may be cast-nets with fine meshes, wall-nets dragged up small watercourses, purse-nets similarly used, and even sheets may be thus employed. In some places several cast-nets are joined together to stop up all passage of fish along a stream, while others are employed above this obstacle; or several fishermen surround a pool, each armed with a cast-net, and these they throw all together, giving the fish but little chance of escaping. In Sind the fishermen in certain suitable localities float down the Indus upon a gourd or hollow earthen pot, while the net is let down beneath them; as a Hilsa-fish, *Clupea ilisha*, ascends up the muddy and rapid stream, it strikes against the dependent net, which is made to contract like a purse by means of a string that the fisherman holds in his hand.

Irrespective of the modes already detailed as in common use for capturing fresh-water fishes in India and Burma, there are a number of what may be termed minor plans likewise in force. Sheets have already been remarked upon as employed for taking the fry which have ascended small watercourses or are found in shallow water, while they may be also used as dip-nets, being sunk in an appropriate place, and raised by strings attached to the four corners as soon as the little fish have been enticed above; or on the sheet bushes may be placed: here the fry seek shelter from the rays of the sun, and the whole concern is lifted bodily up. A little grain or bread is likewise found useful as a bait. Two pieces of rattan may likewise be employed, crossing one another in the middle, where they are tied together; the ends are then bent downwards in the form of two arches. Here a net is attached, and this the fisherman presses down upon the fish, which are then removed by the hand. In some places they may be so absolutely frightened as to permit themselves to be readily taken; thus ropes to which at intervals are attached bones, leaves, stalks of kurbi or jowaree, or pieces of solar (pith), or small bundles of grass are

stretched across a stream; two persons, one at either end, constantly jerk this rope, causing the fish to dart away towards nets that are fixed to entrap them.

Snare of the most varied description are almost universally employed; but in some localities angling may be said to be almost unknown, especially in Orissa, or districts where wholesale poaching is preferred as easier and more killing. One method of using hooks is perhaps as cruel as could well be devised. A number are securely fixed, at regular intervals of about three inches, to a line for employment in a narrow pass in a hill-stream. When used, the rope is sunk from eighteen inches to two feet below the surface, and held by a man on either bank; others drive the fish towards this armed cord, and as they pass over it the line is jerked for the purpose of hooking the fish. In some places dexterity has been arrived at by constant practice, and many fish are then captured. The object is to hook it by its under surface; but, as might be supposed, although in some cases the hooks penetrate sufficiently deep to obtain a secure hold, such is by no means invariably the case. The struggles of the wounded creature are frequently sufficient to cause it to break away, often with a portion of its intestines trailing behind it. If its gill-covers have been injured, respiration may be wholly or partially impeded; crippled, it wanders away to sicken and die in an emaciated state, while, should it be captured before death has stopped its sufferings, it is useless as food unless to the lower animals. Baited hooks are in some places fastened to lines, which are tied to bamboos fixed in the beds of rivers, or to bushes or posts at their edges, and so managed that when a fish is hooked the line runs out; or a somewhat similar plan is to have a cord stretched across a river, floated by gourds; to this the short lines which have the baited hooks are attached, but so that they are not long enough to reach the bottom; these are visited every few hours. In some districts night-lines are baited with frogs.

Spearing fish by torchlight is extensively practised in the Punjab and in the Presidency of Bombay; and they are speared during the daytime in the cold months of the year when they are not very active. Two persons usually engage in this occupation; one punts the boat along as noiselessly as possible, while the fisherman stands at the prow, silently pointing out the direction to be taken, and uses his spear when he gets a chance. Shooting

fish with guns is carried on in Oude, and occasionally elsewhere. This is more generally employed for the Snake-headed Walking-fishes (*Ophiocephalidæ*), which are frequently seen floating on the surface of the water as if asleep. They may be approached very closely, but the game usually sinks when killed, and has to be dived for or otherwise obtained. Cross-bows are also employed for a similar purpose in Malabar. In Mysore, observed the native officials of the Nagar division, fish are taken by nets, traps, hooks, cloths, by the hand, by baskets of different shapes, by damming and draining off the water, by shooting, by striking them with clubs, with swords, or with choppers, by weirs, and by various descriptions of fixed engines; in short, by poaching practices of every kind, as well as by fishing with rods and lines, and poisoning pools of water. Even fishes' eggs do not escape the general hunt to which the persecuted finny tribes are subjected in these days, the ova being collected and made into cakes, which are considered great delicacies.

CORRIGENDA.—Page 431, ten lines from bottom, for “Roaches” read “Loaches.” Page 436, top line, after “not” add “only.”—F. DAY.

ON THE FLIGHT OF THE FLYING-FISH.

BY C. O. WHITMAN.*

AMONG those animals that enjoy the much-envied power of flight, none has elicited such universal interest and comment as that anomalous member of the finny tribe, the Flying-fish. This fish owes its generic name to a curious belief which is said to have been current among the ancients. They supposed that the Flying-fish—“sea swallows” they called them—left the ocean at night and slept on shore, to avoid the attacks of their marine enemies. From this habit of “sleeping out” they were called *Exocæti*.

Besides *Exocætus*, which includes between forty and fifty different species, there is a genus of Flying-fish called *Dactylopterus* (finger-winged), from the fact that the fin-rays extend, finger-like, beyond the margin of the fins. This genus, popularly named the Flying-gurnard, is represented by comparatively few

* From the ‘American Naturalist’ for September. Slightly abridged.

species which inhabit the Atlantic, the Mediterranean Sea, the Indian Ocean and Archipelago, and the Japan Seas.

To those who may never have had the opportunity to observe the flight of these fishes, it may seem a matter of no little surprise that it is still an unsettled question whether they fly or skim. The difference of opinion on this point is all the more remarkable, as the flying fish has been known at least since the time of Pliny and even Aristotle, and has always attracted the attention of voyagers. Although its aerial flight, to accomplish which it has to leave its native element, is not at all more remarkable than the sub-aquatic flight of the Guillemots, Grebes, Auks, and Penguins, all of which are accustomed to change temporarily their own element for that of the finny race, to move through the water with even greater rapidity than the fishes themselves, and to remain submerged longer than the Flying-fish remains above water; and although the modification of the fins for aerial locomotion is certainly not greater than that of the wings of the Auks and Penguins for flight under water; yet the testimony of able scientific witnesses in favour of the actual flight of *E. rocartus* has been often challenged by equally good observers, and plausible reasons have recently been urged against even the possibility of such flight.

It is maintained by many, perhaps the majority of observers, that the *E. rocarti* are sustained by the parachute-like action of the pectoral fins, which they simply hold outstretched during their passage through the air. According to this view the fins exhibit none of that "poetry of motion" seen in the bird's wing, being capable of only a passive kite-like action, like the membrane-wings of the Flying Squirrel (*Pteromys*), the Flying Lemur (*Galeopithecus*), the marsupial Petaurists (*Petaurus*, Shaw), or the foot-web of the Flying Frog of Borneo.

* * * * *

Burmeister, in his 'Reise nach Brasilien' (Berlin, 1853, p. 36), declares that he watched the Flying-fish for a long time, and saw with certainty "that they made no kind of movement with their large pectoral fins, but held them quietly outspread like a parachute."

In his well-known work on 'Animal Locomotion' (p. 98), Pettigrew says:—"Whether the Flying-fish uses its greatly-expanded fins as a bird its wings, or only as parachutes, has not,

so far as I am aware, been determined by actual observation. Most observers are of opinion that these singular creatures glide up the wind, and do not beat it after the manner of birds; so that their flight (or rather leap) is indicated by the arc of a circle, the sea supplying the chord."

From a careful examination of the structure and action of these, fins Pettigrew was able to satisfy himself that "they act as true pinions within certain limits." That this restrictive phrase, "within certain limits," is intended to exclude a flapping motion is evident from the following:—"The flapping and gliding action of the wings constitute the difference between ordinary flight and that known as skimming or sailing flight. The flight of the Flying-fish is to be regarded rather as an example of the latter than the former, the fish transferring the velocity acquired by the vigorous lashing of its tail in the water to the air."

Pettigrew shows that all kinds of wings, when extended in flight, have a kite-like action, or a "combined parachute and wedge action," independent of any beating movement; and it is to this action alone that he refers when he says the pectorals "act as true pinions within certain limits."

So much for the negative testimony.

In favour of the flapping motion of these fins we have the testimony of Capt. de Freminville,* who says:—"I have been able to convince myself that they (Flying-fish) do actually fly, impressing upon their fins, which serve them as wings, a rapid movement—a species of vibration (*frémissement*)—which sustains them and causes them to advance through the air."

Speaking of these fish, which he saw on the way from Callao to Lima, De Tessan † says:—"J'ai très-bien vu un poisson-volant battre d'abord des ailes en l'air, et puis les faire vibrer en planant."

In the 'Reise der *Novara*' (1857-59), p. 109, occurs (according to Professor Möbius) the statement that "Careful observation enables one to see that the wing-like pectoral fins of the Flying-fish are capable of a vibrating movement, like the wings of a Grasshopper." * * * * *

A. v. Humboldt ‡ says:—"Notwithstanding the astonishing swiftness of their movement, one can convince oneself that the

* Ann. des Sci. Nat., vol. xxi., p. 102, 1830.

† 'Voyage autour du Monde sur la Vénus,' Paris, 1844.

‡ 'Reise in die Aequinoctial-Gegenden des neuen Continents' (1815).

animal beats the air during its spring, *i.e.*, that it alternately opens and closes its pectoral fins."

* * * * *

I will now pass to my own observations on the flight of Flying-fish, made during a voyage from San Francisco to Yokohama, on the steamer 'City of Peking,' reserving till the last the consideration of the recent elaborate paper of Professor Carl Möbius.†

Of the nearly twenty-three days that elapsed between departure and arrival (1st to 24th August, 1879), at least ten were favourable for the study of the question under consideration.

Aware that these fish are now generally regarded as skimmers rather than flyers, notwithstanding the testimony of very trustworthy observers to the contrary, I determined to satisfy myself, if possible, on this one important point.

I found the most favourable place for observation to be the bow of the steamer, and the best hours to be in the morning from five till eight or nine o'clock, and in the afternoon between three and six o'clock. Observations made when the air was quiet and the sea perfectly smooth, so that the fish could often be seen before they left the water, were the most satisfactory and conclusive. A stiff breeze, a billowy sea, a tossing ship, and an easy chair are not conditions which facilitate accurate observation, and to such conditions, doubtless, is to be attributed the ill-success of many who have undertaken to decide this question.

* * * * *

Under the favourable conditions just mentioned, it is by no means difficult to determine whether the fish executes any flapping movements with its pectoral fins. As I have seen them come out of the water directly under my eyes, I have been able to see distinctly the individual flaps of the large pectorals, while the ventrals were held in quiet expansion. The flapping movement, which is quite regular and rapid—so rapid that it is not easily recognised at any great distance until experience has sharpened the eye—may be continued for the whole or a part of the flight; but is generally discontinued after the first few rods, and the course completed by a pure skimming or sailing movement. In some cases I have seen the flapping of the fins renewed

* "Die Bewegungen der fliegenden Fische durch die Luft" (Zeitschrift für Wissenschaftliche Zoologie, Supplement to vol. xxx., p. 343, 1878).

once or twice after short intervals of the sailing movement. In the case of young fish from a half to one and a half inches in length, many of which I saw leave their native element to essay the rarer medium, the strokes of the fins are continued throughout the short flight; and the resemblance between these tiny fin-flyers and flying insects is most striking.

The course of the flight is generally in a straight or curved line; but on several occasions I have seen it abruptly changed, apparently by the aid of the tail, the lower lobe of which was brought for a moment into contact with the water.

In one instance I saw the course thus changed three times at intervals of only a few seconds. The fish came out of the water only a few feet from the steamer, flew outward and backward, then, suddenly turning, came towards the steamer, striking the crest of a wave within a few feet of the same, it darted alongside, and again dipping its caudal lobe in the water, wheeled directly away from the boat and plunged into the ocean. In the majority of observed cases, where the tail was made to touch momentarily the water, the course was not changed, the tail appearing to act, as Dr. Kneeland has already remarked, like a spring for raising the fish.*

In the case of a breeze, the direction of flight, as a rule, was either against that of the wind, or formed a more or less acute angle with it; not unfrequently, however, the flight is with the wind, or at right angles to it.

The longest flight observed lasted not less than forty seconds, and its extent was undoubtedly over eight hundred feet, and may have exceeded twelve hundred feet. This remarkably long flight began near the right side of the steamer, and was performed in a long curve, which formed at first nearly a right angle with the boat, then moving directly against a gentle wind, but gradually turned backward, so as finally to coincide nearly with the direction of the wind.

While the average flight does not perhaps exceed fifteen seconds, nor extend about four or five hundred feet, yet I have observed numerous cases in which it was continued twenty to thirty seconds.

That this flight, executed in a horizontal plane, which, according to the concurrent testimony of all observers, is seldom raised

* Proc. Boston Nat. Hist. Soc., 1872, p. 138.

above the surface of the water by more than two or three feet, continued for ten to thirty or forty seconds, and extending a distance of one to eight or more hundred feet, can be due to the impetus gained by a single spring combined with the parachute-like action of the fins, seems to me, aside from the oft-repeated testimony of my eyes, quite incredible.

It is maintained, however, by Prof. Möbius, in the article before mentioned, that the pectorals of the Flying-fish execute no flapping movement during flight; and this view is based not only on the author's observation of the flight of many *Exocoeti* and one *Dactylopterus*, but also on anatomical and physiological grounds.

No one, so far as I know, has undertaken so elaborate a discussion of this question, and approached it from so many different standpoints as Prof. Möbius; and his conclusions will, on this very account, undoubtedly command the assent of many naturalists who have had no opportunity to settle the question for themselves. It is not, therefore, surprising to find that Prof. Bardeleben, in his review of this paper, in Hofman and Schwalbe's 'Jahresberichte über die Fortschritte der Anatomie und Physiologie' (vol. vii., part 1, p. 129), appears to accept as conclusive the opinion so ably maintained by Prof. Möbius. Had I not seen many times with my own eyes, under circumstances so favourable as to forbid all manner of doubt in my own mind, the flapping of these fins, I might have accepted the conclusions of the German naturalist, and overlooked the assailable points of the arguments adduced in their support; but with the positive assurance that he is in error on the main question, I have been led to question the validity of some of his interpretations of facts. That I have fairly stated the position of this author in regard to the function of the pectoral fins of the Flying-fish will appear evident from the following citations:—

"If during the entire flight the pectoral fins of flying fishes actually made motions similar to those of the wings of bats, birds, and insects, one would be able to perceive them quite as well as the strokes of equally large wings of bats and birds" (p. 353).

This statement is open to the objection that it entirely ignores the fact that the colour of the fins, the rapidity and sweep of their vibrations have a vast deal to do with the question whether the fin-strokes would be as easily recognised as the wing-strokes of the bird or bat.

“Flapping movements of the large shining pectorals would make themselves visible by the alternate appearance and disappearance of the light reflected from them. They would escape no accurate observer who viewed the fully-expanded pectorals from the height of a steamer. But as often and as long as I have been able to follow, with my eyes, Flying-fish, which came out of the water near our boat, I have never seen light reflected in this manner from the pectoral fins as from the wings of birds and bats” (p. 353).

That these movements have escaped Prof. Möbius is then evident from his own testimony: what application then is to be made of the statement that “they would escape no accurate observer?” This author first attempts to account for the fact that many good observers have affirmed the wing-like movement of the fins on historical and psychological grounds, asserting that this “false notion” had its origin in a fancied resemblance of these fishes to swallows, and that it has been handed down from the times of Aristotle and Pliny to the present time simply on authority; and afterwards, as if aware that this was not altogether a satisfactory solution of the question, admits that these observers may have had some grounds for their statements, but thinks they were deceived by appearances, which they did not understand, into the belief that the fins behave like wings. He is very frank in telling us just what these appearances are, although no one, not even Möbius himself, has ever observed such phenomena in a living *Exocoetus*.

“Just as a sail begins to slacken and vibrate the moment the wind blows parallel to its surface, so the more flexible and elastic distal and ventral parts of the pectoral fins are thrown into rapid vibrations when the air-current moves parallel to their surface” (p. 370).

As a simile, this will do very well, but how is it as a matter of fact? We are assured that this comparison is fully justified by the following simple experiment:—A specimen of *Exocoetus*, shrivelled, distorted, and stiffened by long soaking in alcohol, was suspended, and its pectorals exposed to a swift current of air in such a manner that the current swept along both surfaces. The fins thus exposed “made directly under my eyes the same rapid quivering movement that various good observers of Flying-fish have regarded as a flying movement” (p. 370, 371). It is im-

portant to observe that Möbius has here affirmed an identity without any authority whatever. He shows his deference to the statements of "good observers" by undertaking to sweep all their testimony out of court by the mere breath of his private opinion. Surely this is a most facile mode of reconciling contradictory testimony!

If Möbius merely announces it as his opinion that the tremulous movement observed in his experiment is identical with the movement that has been so often interpreted as a true flying movement, then we have simply to raise objections.

There are three questions here to be considered: 1st, whether the fins probably exhibit such movement; 2nd, whether such a movement, if made, would be probably recognised; and 3rd, whether, if recognised, it would likely deceive "good observers."

It would seem that the wings of a sailing-bird, such as a Gull or a Hawk, would be quite as likely to exhibit such motion as the fins of the Flying-fish; and it would be much more easily recognised in the former than in the latter.

With reference to this point I watched the long-winged Gulls that were seen almost every day of our voyage. These birds were often circling about the stern of the boat on the watch for waste bits of food, and were remarkably good skimmers, moving the most of the time without flapping the wings. I very rarely saw any vibratory movement that could be attributed to the wind alone, and never anything of the kind that was of more than a momentary duration. It is very evident that, under conditions that would render possible a continuous movement of this kind, the bird, as well as the fish, would inevitably fall to the water.

Is it probable that a momentary quiver in the comparatively small fin-wings of a swiftly-moving Flying-fish would be noticed? The fact that no naturalist has ever affirmed anything of the kind except Möbius, who bases his assertion on an experiment with an alcoholic specimen, is sufficient answer to this question.

As to the probability of any one being deceived by such motion, I cannot, of course, judge from experience, as I have never been so fortunate as, in the first place, to detect it, and, in the second place, to discover that I had erroneously interpreted it. I cannot persuade myself, however, that any "good observer" would be likely to make such an egregious blunder.

That Möbius does not regard this hypothetical quivering as in any sense a true flying movement, he states in the most unequivocal manner, and goes on to ask, "How, then, are the *Exocoæti* able, without touching the water, to rise over the waves? For this also they make no fin-strokes. They do not raise themselves, but are passively raised by the ascending currents of air, which are caught in the grooves on the under surface of their pectoral fins" (p. 371). Notwithstanding the oft-repeated affirmation that Flying-fish do not actually fly, our author seems, in one place, to admit the possibility of the flapping of the fins during flight. "These explanations of the movement of the Flying-fish do not imply that an *Exocoætus* or a *Dactylopterus* cannot make powerful and plainly recognisable movements with its tail and pectorals during its ascent (out of the water), and even occasionally in the middle of its course, if prompted thereto by a strong wetting of the body by the waves" (p. 372).

This statement, interpreted in the light of the context, cannot be said, however, to involve a contradiction; the author simply means that the fins and tail may be used in getting out of the water, and that these movements may possibly be recognised just as the fish rises. But he still maintains that the wing-like movement attributed to them by many observers, "arises not through muscular action, but through the elasticity of the outspread fins and the pressure of the air, which act alternately against each other" (p. 353, 354).

Passing on from these explanations, which presume to reconcile conflicting statements by pronouncing all that will not be reconciled fallacious, and by substituting others of a less obstinate but of a purely hypothetical nature, which seem to admit of a quasi-explanation, we have next to notice the arguments urged from an anatomical and physiological standpoint.

"I believe, then," says Möbius, "that I have refuted on anatomical and physiological grounds, the opinion that Flying-fish use the pectoral fins as wings" (p. 368).

In this entire discussion, Möbius tacitly assumes that there can be but two opinions on this question, namely, his own opinion, which he shares with many others, and the opinion attributed, with more or less justice, to A. v. Humboldt, Kneeland and others, that the fins are flapped with great rapidity throughout the entire flight. While the claim to have refuted the latter

opinion seems altogether too pretentious, it may be freely admitted that the reasons adduced have much more force against it than against the view here maintained, that the flapping movement is generally continued for only a part of the flight.

The frequency of the fin-strokes is made the first point of attack. Referring to the number of revolutions made by the bird's wing per second, which, according to Marey,* are for the Sparrow, 13; Wild Duck, 9; Pigeon, 8; Moor Buzzard, $5\frac{3}{4}$; Screech Owl, 5; Buzzard, 3; Möbius remarks:—"If Flying-fish make a still larger number of fin-strokes per second, then the fin-muscles must be able to contract even more rapidly than the pectoral muscles of birds and all other vertebrates."

Then follows a comparison of the muscles of certain fishes with those of mammals, birds and frogs, in respect to the time required to execute a muscular contraction—all with a view to showing that the muscles of *Exocoetus* are incapable of making very rapid contractions. The strength of this argument is impaired by two facts; 1st, the duration of a muscular contraction has never been determined for *Exocoetus*; and 2nd, the number of fin-strokes per second has never been estimated, much less experimentally ascertained.

Furthermore, it does not follow, as Möbius asserts, that if the Flying-fish make more than thirteen fin-strokes per second, its fin-muscles must be able to contract more rapidly than those of birds. That they would be more rapid than those of some birds under some circumstances, can be safely asserted, and nothing more. The number of revolutions made by the Sparrow's wing in a second is greatly exceeded in the wing of the Humming-bird; and the figure given by Marey does not represent the maximum number of strokes of which the Sparrow's wing is capable. A complete "muscle-curve" consists of a "latent period," a contraction and a relaxation, as every tyro in physiology knows, and the last two phases may vary much in duration according to circumstances.

Again, the size of the fin-muscles is said to be incompatible with the theory that the fins execute true flight.

The average weight of the entire bird, as determined by Harting for thirteen birds belonging to different orders, is 622 times that of the pectoral muscles. In the case of *Chiroptera*,

* 'Animal Mechanism,' p. 228.

according to the Dutch physiologist, the body weighs 136 times as much as the pectoral muscles; and the relation between the same in *Exocætus* was found by Möbius to be as 32·4 : 1.

If the work performed by the muscles of flight be proportional to the weight of the body, then, as Möbius observes, the pectoral fin-muscles of *Exocætus* must develop about five times as much force as the pectoral muscles of birds, and about two and one-half times as much as the same muscles of the bats.

The objection from this point of view has been greatly over-estimated by Möbius. As Flying-fish generally move their pectorals during only a part of their flight, which is at most short, they do not need to expend so much muscular energy as birds and bats, which take long-continued flights. Small muscles may perform, for a brief period, work which only larger muscles would be able to perform for a long time. Möbius seems to have overlooked the fact that time, as well as size, is an element of this problem.

Perhaps also the large air-bladder may, as Humboldt supposed, have something to do with lightening the work of the muscles, while serving as a store-house of oxygen.

The experiment of Humboldt, by which he determined that the fin-rays of *Exocætus* move with five times greater force than the rays of other fins, would seem to favour the opinion here maintained. Admitting that in form, size, length, and structure, the pectoral fins of *Exocætus* are less well adapted to flight than the wings of most birds, there is still ample room to believe, on anatomical and physiological grounds alone, that they are capable of executing true flight.

In regard to the personal observations of Prof. Möbius, it may be said that they can lay no claim to the right of deciding this question. Whatever evidence they afford is of a purely negative character; and of this fact Prof. Möbius seems to be fully aware, if we may judge from the stress which he lays upon other considerations. That he and others may not have been fortunate enough to recognise the wing-like motion of the pectorals, establishes at most only a probability, which weighs very little against the positive evidence afforded by the testimony of those who have actually seen Flying-fish fly.

OCCASIONAL NOTES.

MAMMALS AND BIRDS FROM PORT LEOPOLD.—In 'The Ibis' for 1878 (pp. 420-442) Mr. Henry Stevenson published a paper containing the observations of the late Surgeon Edward Adams on the birds of Michalaski, and in the same paper he gave a memoir of the brief but eventful career of this talented officer. Mr. Adams entered the Royal Navy as Assistant Surgeon in 1847, and, having volunteered for Arctic Service, was appointed to the 'Investigator,' Captain E. J. Bird, which vessel, in company of H.M.S. 'Enterprise,' sailed from England for Lancaster Sound and Barrow Straits, in search of Sir John Franklin, on the 12th June, 1848, and returned to England in the following year. This Expedition, under the command of Capt. Sir James C. Ross, was greatly delayed on the outward voyage by bad weather and the unfavourable condition of the ice, and only reached Port Leopold on the 11th September, 1848, where it wintered in N. lat. $73^{\circ} 50'$, W. long. $90^{\circ} 20'$. Amongst the papers and drawings of the late Surgeon Edward Adams, which are now in the possession of Mr. Henry Stevenson, to whom I am indebted for an examination of them, there are but few notes referring to the eleven months' stay at Port Leopold, beyond a list of the animals obtained there. The mammalia mentioned by Surgeon Adams as obtained at Port Leopold are *Ursus maritimus*, *Canis lagopus*, *Arvicola hudsonius*, and *Cervus tarandus*. In all probability it is an oversight that no species of Seal is included. The list of birds, which comprises twenty-three species, would not possess any very special interest were it not taken in connection with the observations of others who have supplied us with ornithological records from three other localities to the southward of Port Leopold, almost on the same meridian of longitude, and along almost a continuous coast-line, but separated by four degrees of latitude, or about 250 miles. The authors referred to are Sir James C. Ross, who between 1829 and 1833 carefully worked out the Ornithology of Boothia; Dr. John Rae, who wintered at Fort Hope, Repulse Bay, 1846-47; and Dr. David Walker, Naturalist to the 'Fox,' who wintered at Port Kennedy, N. lat. 72° , W. long. 94° , in 1858-59. I have transferred from the note-book, now the property of Mr. Henry Stevenson, Surgeon Adams's list of birds, without any alteration in the synonymy or re-arrangement of the species:—*Strix nyctea*, *Merula* —? *Corvus corax*, *Linaria minor*, *Emberiza nivalis*, *Tetrao rupestris*, *Tringa maritima*, *Anser brenta*, *A. Hutchinsii*, *Somateria spectabilis*, *S. mollissima*, *Harelda glacialis*, *Colymbus septentrionalis*, *Uria Brunnichii*, *U. grylle*, *Procellaria glacialis*, *Lestris Richardsonii*, *Larus Sabinii*? *L. glaucus*, *L. argentatus*, *L. leucopterus*, *L. eburneus*, *L. tridactylus*.—H. W. FEILDEN (Norwich Barracks).

YOUNG POLAR BEARS AT THE ZOOLOGICAL SOCIETY'S GARDENS.—The Zoological Society has just received from Mr. Leigh Smith a valuable present in the shape of two young Polar Bears, which that gentleman brought home in his steam yacht 'Eira' (a vessel of 350 tons) on his recent return from the Arctic regions. He and his companions, with a crew of twenty-five, sailed from Lerwick on June 22nd, and a week later were facing the ice about Jan Meyen Island. They then steamed N.E., to be confronted speedily by the impenetrable main pack. Changing their course to the S.E., and coasting the edge of the pack they fell in with numbers of Bladder-nosed Seals, a great many of which were shot. Failing to find an entry through the increasing packs, they worked the ship to the westward, only to get mixed up in fog and ice together, and to battle their way out again. The northward was tried, but after many attempts to break through the pack, they had to 'bout ship and return to the open sea. Here they met with a strong gale which lasted three days, and compelled them to take shelter in Magdalen Bay, Spitzbergen. Afterwards, clearing the South Cape they ventured southward, to meet the relentless barriers once more, and to be compelled to a south-westerly course. Then they pointed their vessel northwards, and made attempts to find a passage through the ice between 77.14 and 79.4 latitude. Driven off by a violent gale, they approached the ice-girt land in still another direction: this time to find an island, where they caught seventeen Walrus and some Snow-birds, *Pagophila eburnea*. Several more islands were discovered, and also a splendid harbour between two of them, which was named, after the yacht, Eira Harbour. They made various trips from this safe anchorage, reaching as far as 80.20 north latitude, killing eighteen Polar Bears, besides capturing the two young ones above referred to, which, with the surviving Snow-bird, were sent to the Zoological Gardens. Leaving the harbour, they had to follow the coast to the north-west, but had again to give up in consequence of the ice dragging the ship with it. By this time the short summer season was exhausted. Having got into the ice regions, the difficulty now was how to get out of them. This was accomplished by steering in turn in the direction of almost every point of the compass, until at last the adventurous steam-yacht reached Norway, to be flung ashore on a reef at the entrance of Tiel Sound through the incapacity of a pilot. Towed off after some difficulty, the vessel reached Peterhead on the 12th October, where, it is understood, the Eira is only to remain until the opening month of next year, when Mr. Smith will renew his researches. Immediately on his arrival, Mr. Leigh Smith telegraphed to Mr. Bartlett to know if he would accept for the Society the two young Polar Bears, and if so to send for them at once. Mr. Clarence Bartlett accordingly proceeded to Peterhead, where he found the Bears already packed in two large casks; the head of each cask having been knocked out and fitted with iron bars. The Bears were at once brought

direct to London by a fast train from Peterhead, and may now be seen in one of the Terrace Dens in the Zoological Gardens, close to the den of their larger relative, which, if we mistake not, was also presented by Mr. Leigh Smith. These young bears are at present about the size of sheep, and, with the exception of some slight contusions about the head and face, caused doubtless by their attempts to escape from on board ship, they appear in excellent health and condition, and likely to do well. They certainly form an attractive addition to the Society's already rich collection of Carnivora.—
J. E. HARTING.

THE YOUNG OF THE IVORY GULL.—It was with much interest that I examined the young Ivory Gull, *Pagophila eburnea*, now living in the Eastern Aviary of the Zoological Gardens, and which, with two young Polar bears, had been brought back by that successful Arctic explorer, Mr. Leigh Smith, from his late cruise as far as the shores of Franz-Josef Land, first discovered by the Austro-Hungarian Expedition. This is, I believe, the first specimen of the bird ever received by the Zoological Society, and is by far the youngest that I have ever had the good fortune to examine. Most ornithologists were aware that the adult was pure white, and that the immature birds in the previous plumage were white, more or less spotted with blackish brown on the back, wings, and tail, in some cases also showing some dark colour about the base of the bill and the lores. The individuals with this kind of indistinct "mask" were, however, the youngest known to us, no earlier plumage being described by Mr. Dresser in his grand work on the 'Birds of Europe.' Many of your readers may be surprised to learn that the young Ivory Gull in its first plumage is mainly of a smoke-grey, nearly as dark as a Fulmar Petrel on the upper parts, and especially so on the tail-coverts, the feathers of the the back and wing-coverts being striated, and the head bearing not merely a mask, but a short hood of a darker grey than the neck and the under parts. In fact, so much did the specimen in question resemble a young Fulmar, that my first thought was to scrutinize his bill; that was quite "in order," and he gave me every opportunity of observing it by attempting to devour my fore-finger; but his hinder parts he did not care to show, being perhaps conscious that his tail was somewhat defective, owing to abrasion. The tone of the grey colour may perhaps have been deepened by the dirt acquired on board the steam-yacht, where he is said to have frequented the stoke-hole, but he has been constantly washing since his arrival in the Gardens, and there can be no doubt that the above is a rough description of the normal plumage of this gull at from three to four months old. I was not unprepared for this, having been told by those who have visited Spitzbergen that the young were quite dark; but it was one of those things not generally known, and the presence of the hood is both new and

interesting. In this respect the young Ivory Gull resembles the South-American Gulls, *Larus fuliginosus*, *L. belcheri*, *L. tenuirostris*, *L. scoresbii*, the Californian *L. heermanni*, and the Japanese *L. crassirostris*, all of which have more or less of a hood in the immature stage, and lose it as they grow older. I may perhaps be allowed to repeat here my remarks (Proc. Zool. Soc., 1878, p. 162) on the genus *Pagophila*, viz., that "The short stout bill, coarse rough feet with serrated membranes, much excised webs, and strong curved claws, appear to entitle this species to generic separation. The hallux is connected on the inside of the foot by a serrated membrane with the inner toe, a peculiarity which I do not recollect seeing noticed elsewhere."—HOWARD SAUNDERS (7, Radnor Place, W.).

RARE BIRDS AND THE AUTUMNAL MIGRATION.—It is not unworthy of record that several rare species of birds have reached our shores this autumn about the same dates. Thus, a number of Great Snipes have been recorded from England; I have myself seen two Snipes here, on the 27th September, which I feel confident were of this species, and one I have a record of was shot at Darmore Castle, Northumberland, on September 21st. As is now pretty well known to naturalists, the Great Snipe during summer is an inhabitant of the northern parts of the Old World. A Turtle Dove has been procured at Stonehaven, Kincardineshire, and was received for preservation by Mr. Robert Small, Edinburgh, on the 21st September. The breeding range of this species on the Continent of Europe extends north as far as 60° N. lat. in Russia, and somewhat farther north in Scandinavia. A Red-legged Hobby has been procured, and was sent in to Mr. Small on the 20th September. In the summer season this species occurs as far north as Archangel in Russia. An Esquimaux Curlew was shot on a hill in the Forest of Birse, Kincardineshire, on September 21st, and was sent in to Mr. George Sim, naturalist, Aberdeen, for preservation. The Esquimaux Curlew is an inhabitant, during the breeding season, of the Hudson's Bay Territories and Arctic North America; but neither the Turtle Dove, Red-legged Hobby, nor Great Snipe, so far as is known, occurs in the breeding season in North America. It seems suggestive of the route by which North American species visit England and Scotland and certain parts of Continental Europe, that these species appear together, brought over by the same winds, about the same time. I think it will be found before long that the old idea that birds from North America have reached Europe for the most part *via* the N.W., striking the Norwegian coast, and rebounding, as it were, upon the coast of Aberdeenshire, will be given up, and the later one adopted, namely, that the greater part, if not all, come to us from the far north-east. I exclude from this general statement, or theory, however, the *Natatores*, whose movements, so far as we are aware, proceed during autumn migration from north to south, as

nearly as possible, and *not*, like land birds and waders, from east to west. The data we have are not, perhaps, in their present unarranged and perfect state, sufficient to enable us to lay this down as a law of autumnal migration. My object is to draw attention to prominent facts and coincidences such as are given above, and thus more fully to direct attention to phenomena of migration. I would take the opportunity of soliciting aid from Scottish observers, as one of a committee lately appointed to investigate the phenomena of migration of birds and to collect statistics. Notes from England should be sent to Prof. Newton, Magdalene College, Cambridge, and to John Cordeaux, Great Cotes, Uleaby, Lincolnshire.—J. A. HARVIE BROWN (Dunipace House, Larbert, N.B.)

MIGRATION ON THE EAST COAST OF ENGLAND IN THE AUTUMN OF 1880.—As a sequel to Mr. J. A. Harvie Brown's remarks, I may observe that the arrival of these rare wanderers on our coast in September was probably caused by the strong N. and N.E. winds blowing during the third week in September. On Heligoland it is these winds which bring the birds down from N.E. Europe and the Asiatic tundras; with westerly or south-westerly winds blowing, no birds turn up for days together. From some cause or other, many of our immigrants arrived on the east coast much before they were due. Thus Knots were seen in large flocks in the Humber on August 16th. An old male Knot in summer plumage was killed against the telegraph-wire on Kilnsea, near Spurn, on July 24th. A large flock of Fieldfares, as I hear on the best authority, were seen in Norfolk on September 9th, and Golden-crested Wrens at Spurn on September 15th, their average time of arrival being about October 12th. A peculiarity of the season has been the immense number of Wheatears and Redstarts on the coast from Flamborough to Yarmouth during the last week in August and first week in September, full particulars of which will I hope appear in the next report on migration.—JOHN CORDEAUX (Great Cotes, Uleaby).

AVOCET IN SOUTH DEVON.—Some forty years since a bird of this species was shot in the Kingsbridge Estuary, of which I became possessed. Since then I have neither seen nor heard of one occurring in this district until the 2nd of the present month (October), when a person shooting on the estuary saw three on the mud. He was induced to follow them up, and got a shot, which resulted in his killing one and wounding another; the former was brought to my brother, Mr. R. P. Nicholls, who purchased it, and on the following day the wounded bird was picked up dead, and also came into our possession. On dissection the larger specimen proved to be a male; its weight, $10\frac{1}{2}$ ounces; length, 17 inches; breadth, 30 inches. The other, a female, weighed 9 ounces; length, $15\frac{3}{4}$ inches; breadth, 29 inches. Mr. E. Elliot, a young and promising ornithologist, being

anxious to procure the other specimen, followed it up for a day or two, and finally succeeded in shooting it; this bird is also a female. Mr. Elliot states that he had a good opportunity, with the aid of a telescope, of watching it feed, which it did in an easy and graceful manner, with rather slow and measured strides, and passing its head from side to side, scooping up the mud, and occasionally throwing up its head and swallowing what it had taken. It flew with the head and neck extended, which differs from some descriptions given. Some Grey Phalaropes and Arctic Terns have also occurred, and early in the spring a pair of Grey-headed Wagtails, *Motacilla flava* (male and female), were procured in the neighbourhood.—HENRY NICHOLLS (Kingsbridge, South Devon).

AVOCET IN CORNWALL.—On August 21st a specimen of the Avocet, *Recurvirostra avocetta*, a young male of the second year, was shot on the River Fal, near Truro, by Mr. Drinkwater, of that place, who has sent it to Mr. Gill, taxidermist, of Falmouth, for preservation. The late Edward Hearle Rodd, in his 'Birds of Cornwall and the Scilly Isles' (p. 262), says:—"This prettily pied bird has become comparatively rare throughout the kingdom since the drainage of the fen lands has been perfected, by which not only their feeding grounds, but their natural breeding haunts, have been destroyed"; and on page 91 he says, "A very rare visitor to Cornwall." This, I believe, makes the third instance in which the Avocet has been obtained in Cornwall. Notices of previous captures will be found in the work quoted.—HERBERT P. HART (Polbreen, The Lizard).

DOES THE LONG-EARED OWL HOOT?—Not only the Barn Owl, but also the Long-eared Owl, is credited with hooting, and this, too, upon respectable authority; as may be seen on reference to a well-known book, St. John's 'Wild Sports and Natural History of the Highlands' (chap. vii., p. 65, edit. 1847), where the author says of the Long-eared Owl:—"His long ears and bright eyes give him a most unbird-like appearance as he sits watching one. As soon as evening comes on, this Owl issues forth in full life and activity, and in the woods here may be seen and heard in all directions, sitting on the topmost branch of some leafless tree, generally a larch or ash (these two being his favourites), where he hoots incessantly for an hour together, swelling his throat out, and making the eccentric motions of a pouter pigeon." Mr. St. John, on the same page, speaks of the Tawny Owl, as "hooting as vigorously at midday as at night," and says that he has frequently heard this kind of Owl (the Tawny) hoot and utter another sharp kind of cry during the daytime, in the shady solitudes of the pine woods.—A. G. MORE (Dublin).

SUBCUTANEOUS WORMS IN RED-BACKED SHRIKE.—Last June at Kissengen I shot two Red-backed Shrikes, *Lanius collurio*. On skinning one I found a great number of small worms between the skull and skin,

ranging from about one to two inches in length; some hard, round, white, and pointed at head and tail; others broad and flat at one end for nearly half their length, then suddenly narrower. In the case of the other I found two worms, two inches and a quarter or more, between the throat and skin; these were all similar to the hard round worms mentioned above. Both birds were in good condition.—E. F. BECHER (Southwell, Notts).

[We should have been glad to have received specimens, which might have been forwarded safely in a small test-tube filled with any kind of spirit.—ED.]

THE TRACHEA OF THE SPOONBILL.—Messrs. Pratt & Son, of Brighton, have had two Spoonbills sent to them for preservation. One was shot at Littlehampton on October 9th, the other at Shoreham on the 11th. Yarrell, in the third edition of his 'British Birds,' mentions that the trachea of the Spoonbill has "a figure of eight" convolution in front of the lungs. Montagu, in his 'Ornithological Dictionary,' also mentions this convolution, which he says occurs before the trachea enters the cavity of the chest. I examined the bodies of both the birds (one of which was certainly a male, and the other was shot and rather decomposed about the loins, but was also, I am almost certain, a male), but in neither of them did I find the convolution mentioned. As Montagu has expressed his surprise that Willughby did not observe the reflections of the windpipe in the bird he examined, it may be interesting to your readers to know that it was wanting in both the specimens examined by me.—HERBERT LANGTON (Brighton House Dispensary, Queen's Road, Brighton).

[Yarrell has referred to certain instances in which this peculiarity was absent.—ED.]

BLACKCAP IN CO. MEATH.—I have just received a Blackcap Warbler, which was shot at Oldeastle, Co. Meath, by Mr. Alfred Blandford. This is, I think, the only instance noted this year of the occurrence of this bird in Ireland. The specimen in question is a fine adult male, and was chasing another of the same species when shot by my friend.—CHARLES W. BENSON (Rathmines School, Dublin).

[The Blackcap is a regular summer visitant to Ireland, but is very local there.—ED.]

ROUGH-LEGGED BUZZARD NEAR BLACKBURN.—On the 11th October Mr. J. E. Hoyle, of this town, shot a Rough-legged Buzzard on Haslingden Moor. The bird, which is an extremely rare visitant to this district, is an immature male in capital plumage.—ROBERT J. HOWARD (Blackburn).

SHORE LARK NEAR BRIGHTON.—Messrs. Pratt have, alive at the present time, a Shore Lark, in splendid plumage, which was caught near Rottingdean by some birdcatchers, on the 16th October.—H. LANGTON (Brighton).

PROCEEDINGS OF SCIENTIFIC SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.

September 1, 1880.—H. T. STAINTON, F.R.S., Vice-President, in the chair.

Miss Emily A. Smith, Assistant State Entomologist of Illinois, of Peoria, Illinois, was ballotted for and elected a Foreign Member.

Mr. J. Jenner Weir exhibited a male *Odonestis potatoaria* having two-thirds of the upper wings of the yellow colour of the female, and a female of the same species of the usual dull red colour of the male; also a male *Smerinthus Populi*, having the wings almost without markings, and of the light colour generally found in the female, the right antenna being clubbed at the extremity, and not pointed as usual.

Sir Sidney Saunders exhibited six winged examples of the Stylopideous genus *Hylechthrus*, five having been obtained from the specimens of *Prosopis rubicola* exhibited alive at the last meeting, one of the latter having produced two of the former. Four adult larvæ of males were found in another of the same bees which became arrested in its development in the pupal stage. He also exhibited several of these bees having females of *Hylechthrus in situ*, and the puparium of a male extracted entire with the imago enclosed therein; also various Hymenoptera obtained from the same briars, among which were specimens of the Chalcideous genus *Melittobia*, and a new species of *Scleroderma*.

Four other species of *Scleroderma* from Greece are recorded in Professor Westwood's monograph of this genus published in the second volume of the 'Transactions,' 1837—1840. This species is also met with in Corfu in the dry snags of fig-trees during winter.

Miss E. A. Ormerod exhibited some galls found on *Tanacetum vulgare*, and stated that Mr. Fitch had obtained some of a similar kind last year near Maldon, Essex; but the present specimens were peculiar from the gall-growths being not only in the axils of the leaves, but also on the midribs and pinnæ and on the inflorescence. The galls on the leaves are smaller than the others and solitary; those into which the axillary growth of shoots has merged itself are for the most part confluent, forming bunches of as many as seven solid bell-shaped galls grown together at the sides, or sometimes completely surrounding the main stem. In the inflorescence also as many as six or seven galls may be found on the receptacle of the composite flower, these being generally single, but occasionally confluent, and frequently bearing one or more florets on the side of the gall. The galls vary much in size, those on the leaves being only about three-sixteenths of an inch

long, whilst the axillary ones are from about three-eighths to half an inch in length, and those on the flowers of intermediate size. The width is also variable, and depends on the condition of the gall; in the normal state it is about three-quarters of the length, and the gall is bell-shaped, swollen at the base and more or less contracted above, but again spreading at the upper extremity, which is prolonged into several pointed segments, giving the gall much the appearance of a miniature seedhead of *Aquilegia* in reversed position. The gall is depressed in the centre between three segments, where it is also covered with white downy hairs. The colour is green, in some cases turning to purple towards maturity. Internally it is fleshy and solid, with one cavity in the middle of the most typically formed galls, but from their distortion and confluence there may be more. In some of the specimens this chamber communicates by an aperture with the downy depression above, and contains a brilliant orange or scarlet larva, much resembling that of a *Cecidomyia*; whether it is of that genus remains to be seen, as apparently the gall and its tenant are as yet undescribed. The specimens exhibited were found about the 24th of August on the bank of the Brent Canal, near Brentford, on one clump of tansy growing immediately above the water, and the largest numbers were in the inflorescence of a stem which was lying partly in the water with the flower-head a few inches above the surface.

Mr. T. R. Billups exhibited a female specimen of *Polyblastus Wahlbergi*, an Ichneumon new to Britain, taken at Ashstead. A male had previously been captured by Dr. Capron.

Mr. E. Boscher exhibited living specimens of the two varieties of the larva of *Smerinthus ocellatus*, and read the following note:—

“I exhibited last October coloured drawings of *Smerinthus ocellatus*, showing the marked difference between those feeding on *Salix viminalis* and *S. triandra* (Proc. Ent. Soc. 1879, p. xlv). I have now brought for exhibition some living caterpillars found feeding respectively on *Salix viminalis* and apple. I wish particularly to draw attention to those on the *Salix*, of which I found about a dozen feeding on the same plant, and all marked with brown spots. Others which I found on another species of *Salix*, in an osier-bed some little distance off, were of the ordinary bluish green form without the brown spots, and identical with those found on apples.”

Mr. Meldola exhibited some specimens of *Campylogramma bilineata*, a large number of which had been found by Mr. James English near Epping attached firmly to the leaves of the “tea-tree” (*Lycium barbarum*) by the abdomen, in which position they had died, possibly from the effects of a fungoid disease.

Mr. A. H. Swinton communicated a note on *Luciola Italica*.—
R. MELDOLA, *Hon. Secretary*.

NOTICES OF NEW BOOKS.

Modern Wildfowling. By "WILDFOWLER," of 'The Field.' 8vo, pp. 511, with numerous illustrations. London: 'The Field' Office. 1880.

COL. HAWKER'S 'Instructions to young Sportsmen in all that relates to Guns and Shooting' has long been a text-book on the fascinating pursuit of wildfowling, and having passed through at least a dozen editions, must be familiar to everyone who carries a gun. It is full of practical information, much of which is useful at the present day, but having been written just fifty years ago, that portion of the work which relates to guns has naturally grown somewhat antiquated. The vast improvements which have been made in guns of all kinds since the introduction of the breech-loading system has completely revolutionised the notions which were current in Col. Hawker's day.

The same cannot be said of Mr. Folkard's excellent book, 'The Wildfowler,' for this is a more modern work, and one with which no one can dispense who aspires to be an adept in the art of which it treats. Nevertheless this writer has left untrodden a good bit of ground that has now been covered by "Wildfowler" in the work before us. The three volumes seem practically to supply all that can possibly be needed on the subject. "Wildfowler," availing himself of the teaching of his predecessors, has confirmed or refuted the results of their experience by his own, and pointing out the modifications which in many respects have been rendered necessary by modern improvements, has augmented the literature of the subject by much original and practical information. His book, which is an illustrated reprint of articles contributed to 'The Field,' deals not only with the various modes of approaching or decoying and killing wildfowl of all kinds, but enters in minute detail upon the construction of punts, both single and double-handed; sails; punt-guns, muzzle-loading as well as breech-loading; recoil apparatus; and shoulder-guns of all patterns, with the varying loads required for different bores. In addition to this are several chapters devoted to a narration of adventures of the author while in pursuit of wildfowl both at home and abroad, which are very pleasant reading.

As an example of his style we may quote the following passage, which occurs at page 206 :—

“Now, for this sort of night work, in open weather, the staple fowl one kills are Widgeon. It is well known that Ducks, Pochards or Dunbirds, Teal, &c., at flight time resort to inland ponds, rivers, streams, and lakes. This they will do invariably at sunset. But, when the frost is severe, and has lasted some time, then the Ducks, Teal, &c., are, perforce, driven to seek their food elsewhere; and, as the saltings alone never freeze (being twice a-day covered by the tide), there they all repair for their feed, and in such weather there they may be found with the other fowl. But, except under such circumstances, the vast majority of fowl killed over saltings are Widgeon; at times, however, Pintails and Teal remain with them. The whistle of the cock Widgeon is not unlike the words ‘wee—oh!’ softly undulated—hence the name ‘whew’ given them by old naturalists; but, unless set to music, it is impossible to give an idea of its intonation. I had once a musical friend with me in a punt, purposely to get the notes of birds set to music, and he got them so faithfully that he afterwards reproduced their calls marvellously well. He wrote them down for me, but I have mislaid them now. The calls, of course, greatly vary with the spirit of gregariousness, which, in Widgeon, as in men, increases in direct ratio with hard times. Yes, strange as it may seem, it is so. In mild, open weather, the birds scatter themselves over the flats, and do not trouble much about each other, so much so that it is very rare that one gets a good shot at them then, for two reasons: (1) being all dispersed, a good rake cannot be had; (2) just when you are trying to make out the bulk of the ‘company,’ some outlying birds will scream an alert, and the lot are gone! In very hard times, on the contrary, Widgeon crowd together, call themselves together, and stick together; and the harder the weather the tighter they close, partly for warmth’s sake and security’s sake, doubtless, and also because, when one has found a good place, they all want to wrest it from him—just like men.

“The greediness with which such crowds feed, however, tells greatly against them; for, once at it, they do not readily leave off, and the big guns then come into play. If a punter is very cautious in his working, he cannot fail to detect Widgeon feeding, even if they do not call—which sometimes occurs when they are very hungry—by listening for the noise of their bills. Now, when the tide is ebbing, anything sounding like dripping water should be at once investigated, because—although it might be some puddles on the flats emptying themselves in a larch or a creek—it might also be Widgeon feeding, and the two noises, at a distance, are exactly similar. If, therefore, the shooter listens patiently, and the noise is produced by birds, he will soon hear some ‘charming’ from them, which will conclusively

set his mind at rest; or if he looks up carefully, he may perchance discover their whereabouts at once. But he must proceed very carefully when so doing, and he must regulate his actions by their noise and motions. Thus, if the feeding stops, he should stop; then some old cock will probably call, the hens will coo softly in answer, and soon the host will feed again, when the paddles or the setting-pole may be resumed; but, should the punter observe some birds walking away from him, the case is getting critical. The fact is, these birds have not made out yet what cause of alarm they may have; but they have heard something, and are distrustful, and, at the slightest further cause, the lot will take to their wings. It requires then perfect silence for a few minutes on the punter's part; for, no sooner have the suspicious birds begun their evolutions than the whole company throw up their heads to look up and listen also, and, with so many sharp pairs of ears listening and eyes looking, it behoves the shooter to be extra quiet. Indeed, sometimes, notwithstanding all his carefulness, the company rise and sheer off; but, if the harbour is quiet, and no shot has been fired, they may perhaps settle again further on on the flats; and indeed, I once had a second shot myself within a few moments at the same company settling again near the cripples of my first shot; but such are exceptional cases."

If we have one fault to find it is that, although the author has plenty of material, it is not so well put together as it might have been—not sufficiently concise. Many of the chapters might be considerably curtailed without any detriment to the work, and instead of reprinting the voluminous correspondence and criticisms which appeared in 'The Field' on "Wildfowler's" articles as originally published, it would have been much better if the author had briefly stated general results, or better still, re-written his articles, embodying in them all such additions by correspondents as might seem to him of real practical value. By so doing he would have saved much repetition, and would have presented his facts more clearly and forcibly to the reader.

The chapter on the close-time for wildfowl and seafowl (p. 458) seems to have been written, unfortunately, just before the passing of the recent Act for the Protection of Wild Birds, the text of which was given in the last number of 'The Zoologist.' So that the information there afforded concerning Statutes since repealed is not now needed. In a future edition doubtless the author will substitute the text of the Act now in force, with such comments thereon as will suggest themselves to his practical mind. In any new edition, also, we would strongly urge the desirability of furnishing a good Index, the absence of which, from the volume

just issued, detracts not a little from its utility. With this addition sportsmen will have a capital *vade mecum* on the art of Wildfowling; but it is to be hoped that the provisions of the Act for protecting the birds during the close-time may be as rigidly observed as the directions here given for shooting them in their proper season, or before many more winters have elapsed the wildfowler's occupation may be gone.

Glimpses of Bird-Life; portrayed with Pen and Pencil. By J. E. HARTING and L. P. ROBERT. Folio, with twenty coloured plates and forty-three woodcuts and initial letters. London: Sonnenschein & Allen. 1880.

How few artists there are capable of accurately delineating bird-life is only too well known to those ornithologists who, on the eve of publication, have had occasion to require their services. A glance at any of the recently published "Monographs" by members of the British Ornithologists' Union, or at the 'Transactions' or 'Proceedings' of the Zoological Society, or at some of the more important books on Natural History which appear from time to time illustrated with wood engravings, reveals the fact that there are barely half-a-dozen such artists to be found in London. On the Continent, apparently, the case is not very different, if we may judge by the specimens of coloured plates and engravings which reach us from France, Holland, and Germany. The engravers and lithographers, as a rule, both here and abroad, do their work well, so well, indeed, that very often it could not be better; but, as a matter of course, they follow scrupulously and conscientiously the lines of the artist, and if these are faulty the whole effect is marred. The great difficulty is to find a zoological artist who has been able to afford the time to make his studies *from nature*; who declines to be fettered by the conventional outlines of predecessors, and who will put on paper only what he knows or believes to be correct from personal observation or study.

Under these circumstances we hail with satisfaction the advent, to the ranks of this minority, of an artist who can produce such good work as that presented in the volume before us.

M. Robert is a Frenchman who has made a special study of bird-life, and who has acquired the happy knack of hitting off

attitudes which are at once characteristic of the species delineated by him, and thus imparting to them a life-like appearance which is heightened by the general accuracy of his colouring. We are not over-rating M. Robert's work when we say that these French chromo-lithographs, which are far in advance of anything of the kind hitherto produced in England, come nearer to the hand-coloured lithographs of Messrs. Wolf and Keuleman's than any we have yet seen.

The birds figured in the present volume are all life-size, and include half-a-dozen species of British Titmouse, the House and Tree Sparrows; the Brambling, Chaffinch, and Greenfinch; the Hoopoe, Thrush, Blackbird, and Nightingale; the Redbreast, Goldcrest, Garden Warbler, Blackcap, and Whitethroat; in all, twenty species of birds which are, or should be, familiar from their attractive appearance, their song, or their general utility to man as a cultivator of the soil.

An account of each has been furnished (by the Editor of this Journal), in which, it is hoped, there will be found enough information on the haunts, habits, food, nidification, and migration of the different species to interest the reader without boring him.

It has been thought preferable in a work of this kind, wherein the plates form the chief attraction, to give brief but comprehensive sketches of the natural history of the species noticed, rather than descend into minute particulars and comparisons which, however interesting they might prove to practical ornithologists, would probably not entertain the general reader.

As the plates now published comprise only about a third of what M. Robert has finished, the publishers contemplate the issue of another series, should the present work find sufficient favour in the eyes of the public.

Bright Feathers; or, Some North-American Birds of Beauty. By FRANK R. RATHBUN. Illustrated with drawings made from nature, and carefully coloured by hand. Part. I. 4to, pp. 24, with one coloured plate. Auburn, N.Y.: published by the author. 1880.

IN the Introduction to Part I. of this work, the author informs us that "the series is intended to include ten or more species (in

as many parts) of such birds as are found in the North-Eastern portions of the United States most attractive for their plumage colorations; and the plates will contain figures of the female as well as the male of the species under advisement."

The part just issued is devoted to an account of the Purple Finch, *Carpodacus purpureus*, of which a life-sized plate is given. Much care and evident expense has been bestowed in the preparation of this work, and the type and paper are all that can be desired. We regret that we cannot say as much for the text and its accompanying illustration. In the former we do not find so complete and satisfactory an account of the bird selected as one would naturally look for and expect in a work which is announced to deal with so very limited a number of species. There are no new facts in its natural history disclosed, nor have the materials collected on the subject of the memoir by well-known writers on American Ornithology been utilised as they might have been with advantage.

We are even more disappointed with the plate, the hard, unbroken outlines and crude colouring reminding us of the fish-like figures of birds with which natural-history books were wont to be illustrated fifty years ago. This is not as it should be in these days when so much improvement has been made in lithography and colouring.

Mr. Rathbun is apparently a great enthusiast, and we do not doubt the labour which he has bestowed in the preparation of his work; but in undertaking to illustrate it himself, he has shown that he is less skilful as an artist than as a writer.

We commend to his notice such works as Wolf's 'Zoological Sketches,' Buller's 'Birds of New Zealand,' Sharpe's 'Kingfishers,' Marshall's 'Barbets,' Shelley's 'Sun-birds,' Selater's 'Jacamars and Puff-birds,' Legge's 'Birds of Ceylon,' Dawson Rowley's 'Ornithological Miscellany,' Salvin and Godman's splendid work on the Fauna of Central America, and Gould's magnificent folios; a glance at any or all of which will show him how birds can and may be drawn, and will convince him that critics now-a-days have good reasons to be fastidious on the subject of zoological illustrations.

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THIRD SERIES.

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[No. 48.]

THE BEAVER IN NORWAY.*

BY ALFRED HENEAGE COCKS, F.Z.S.

WHILE in Norway again this summer, I took the opportunity of making further enquiries in the neighbourhood of both the places mentioned in my former communication on the subject (p. 233 *et seq.*), where I had been told that Beavers existed. I regret that, being engaged for Elk-hunting by a fixed date in a widely different part of Norway, I was only able to make what Americans would call "a rush" through the country, and can merely, therefore, repeat statements made to me, having been unable to linger and verify them for myself; but as I only give such as I believe to be reliable, I hope that, considering the interest of the subject, they may not be considered altogether valueless, though second-hand statements are naturally received with caution.

In addition to the two names taken from this animal noticed at p. 234, I have since found that *Bjaar* (or *Bjor*, as it is also spelt in more modern fashion) is old Norse, and also perhaps "Döl" (the name for a dialect or patois spoken up the country), for Beaver. In Swedish it becomes *Bjur*;† and there are several names of places in both countries in which this word occurs, as well as several beginning *Björ*, but as some, and probably the

* Continued from p. 236.

† Lilljeborg, p. 346, foot-note. In the 'Svenska. Jägts. Nya Tidskrift,' 1865, p. 150, is "Beavers, or, in the language of the common people, Bjurar."

majority of these last, are corruptions of *Björn* (a bear), I have not thought it worth while to enumerate them. There are two Bjaar Lakes in Norway, in Söetersdal and Nedre Thelemarken respectively. In Österdalen I do not know of the Bøeverdal and Bøever Elv, mentioned in Bowden's 'Naturalist in Norway,' and quoted by Mr. Harting (at p. 443); but there is a brook which I believe runs into the Slem Aa (mentioned in my former paper as having contained Beavers up to about twenty-five years ago), called Bjaar Bæk, in which I was told there had been Beavers within the memory of middle-aged people. There is also a small house, about two English miles from Rena, called Bjaarslan, and a Bjaar Aa, N.W. from Koppang, running into the Glommen. In Sweden there are Bjurholm (west of Umeå), Bjurbäcken (south of Filipstad), and Bjurholm, the name of a brewer in Stockholm. On the island of Hisingen, opposite Göteborg, is a farm called Bjurställ, while the church at the same place is known as Bjorlanda Kyrka.

At the place (S.) last mentioned in my previous communication, where I had been told that Beavers probably existed, I found, among the *flotsam* by the river side, a small piece of the branch of a tree which had been bitten off at either end, most unmistakably, by a Beaver. The people in this part of the country, with hardly an exception, talk only "Döl," a dialect somewhat akin to old Norse, which made communication very difficult for me; and while many of the people whom I questioned either knew little or nothing about Beavers, a few altogether failed to understand me, and, *per contra*, I frequently failed to understand them. One man, however, proved a brilliant exception, and although I could not understand all he said, I at least learned that no Beavers existed at that spot; but that a few, probably about three or four individuals, existed at a place about ten or eleven English miles higher up the river in a straight line, or about twenty-five following the bends. This would agree very well with the appearance of the piece of wood, which is much water-worn, as would be natural after having come down twenty-five miles of river, which, at least as far as I traced its course, is a perpetual succession of waterfalls and rapids.

When in Göteborg, on my way home, I had an opportunity of looking up some of the old volumes of the 'Svenska Jägereförbundets Nya Tidskrift,' and in that for 1868 I found an account

of this locality, from which the following is an extract:—"At one time, but not within the memory of man, Beavers even were found in the valley, and this clearly explains such a name as Björraae—in Swedish this would be Bjurå (= Beaver-river); but they have now entirely disappeared. The law too late interposed a check on man's wasteful greed. It is said, however, that it is still possible to see remains of Beaver's crafty building-undertakings in an out-of-the-way mountain lake."

It is somewhat curious that the name of the man who alone gave me clear information about Beavers in this neighbourhood was Björneraae, which means Bear-river (*Aa*;^{*} Swedish, *å*; Islandic, *á*; German, *aue* or *au*). There is great latitude up the country in Norway about the spelling of proper names, but whether Björneraae is a corruption within the last twelve years of Björraae (the first syllable of which, if it means Beaver, must itself be a corruption of Bjor) I cannot say.

I think it is quite possible that careful search and enquiry on the spot might show that a few individuals are still to be found in some of the lakes or the rivers running out of them, in the wild and thinly populated country some miles to the north and north-east of this place, but have no evidence whatever to offer in support of this supposition.

I was told of two Beavers having been killed about fourteen or fifteen years ago in the D—— river, some few miles to the south-west. I went from S—— straight across country to the other place I had been told of last year (T.), and on the way had to cross a large lake, which I found empties itself into the river in which the Beaver colony is situated which I visited in 1877. I was told that there are two Beaver-lodges close to the spot where I crossed. It was then dark, or I should have made a point of going to see them at once; and next morning, before continuing my journey, I endeavoured to get some one to row me across and show me them, but the only man belonging to the house where I had passed the night was gone in search of a pack-horse for my luggage, and, after wasting some time in a vain search for another man, I finally rowed myself across, but in the hurried search I was able to make found no traces of Beavers.

^{*} *Aa* is in general use in Norway for small rivers; for the larger ones the word *Elv* is used, and as the names of many of these latter end in *a* (= *Aa*), the addition of *Elv* is equivalent to our talking of Windermere Lake.

A small boy, about eleven or twelve years old, who was with the man who told me of the two lodges there, said he had seen a Beaver swimming there last year: he was sure it was not an Otter (and it is extraordinary how generally the Otter and the Beaver are confused), and he was altogether so positive as to leave little doubt on my mind as to the correctness of the statement. Another man, who lived on the opposite side of the lake, did not know of these lodges, but said there were some at the lower end of the lake, where it empties itself into the river, about fourteen English miles from where we then were.

Travelling on, I came to one of the two small rivers near T——, in which I had been told Beavers probably were to be found. These rivers run from some distance parallel to each other, then unite, and flow into a lake just above T——. A man living close to where I struck the river, and in whose company, as driver of a pack-horse, I walked a good many miles, was confident that Beavers occurred thereabouts,—*i. e.*, in the southernmost of these two rivers alongside of which our course lay,—though he allowed that they were rare, and asked if I wanted to buy one: he did not appear to know anything about the other river. The track lay occasionally close down by the river-side, and there were frequent views of it through openings in the trees, but I did not see any traces of Beavers. All across the country here, as before, my enquiries were considerably checked by all the people talking “Döl.” As an example of how easy it is to miss making them understand, after I had been vainly questioning this man for some time, pronouncing “Bœvre” with what I flattered myself was the most correct accent, he suddenly, in a moment of inspiration, asked whether it was “Buvre” I meant!

I met a gentleman on the following day who told me that there had been a pair of Beavers in a small river which runs out of the lake last mentioned and connects it with another lake lower down, but that they had disappeared about two or three years ago. Without much doubt they are the pair which established themselves in 1878 in the R—— Bæk (see p. 235). From what I could learn, there are probably no Beavers in the former of these two lakes at this moment, and almost certainly none in the latter.

A gentleman whom I subsequently met, Herr K——, told me that he had himself found, in June of this year, at H—— (some

miles lower down the river in which the colony first mentioned in my former communication is situated), two dead Beavers, which he supposed had been killed by the timber floating down the stream; one had a wound on its breast. One of his men had also found a dead Beaver a little higher up the river a short time before. This high death-rate not being looked upon as anything exceptional, it is not difficult to understand why Beavers do not get up in numbers, even with the law doing its best to protect them. Herr K—— promised to look for the remains of these Beavers, and to speak to his men, and, if any of them can be found, to send them to me for the sake of the skeleton, and also to send me any he finds dead for the future. He said that when the game laws were made, Beavers were supposed to be extinct, but that since that time they were certainly increasing. This opinion helps to reconcile my statements with those of the writer in the 'Svenska Jägereförbundets Nya Tidskrift,' quoted above, *à propos* of S——, and that of Bowden, quoted by the Editor in the October number of 'The Zoologist,' and with Lilljeborg's. Another gentleman occasionally finds a dead Beaver by the side of the river coming from T——, and he also has promised to send me any such carcase in future.

To sum up, even allowing that there may be a few more in the wild country beyond S —, and even perhaps a few in one or two other localities where I was told there were some on what I considered doubtful evidence, I do not think I am so rash as might at first sight seem in hazarding the opinion that there are not sixty adult Beavers in the whole of Norway. Of Sweden I know very little, and I have only heard of two districts where it appears probable that Beavers exist.

My last sentence on p. 236 is not quite correct, the Beaver being only represented in the Trondhjem Museum by three or four broken pieces of jaw and the skin of a tail, and I was unable to ascertain whether they are European specimens or not; in Stockholm the three stuffed specimens are from Sweden and Germany; and Göteborg Museum is without a European specimen.

ORNITHOLOGICAL NOTES FROM S.W. SUTHERLAND.

BY EDWARD HAMILTON, M.D., F.L.S.

HAVING spent the months of August and September on the south-west coast of Sutherlandshire (South Morar, Arasaig, Loch-na-Nuagh), I send you some account of the birds I noticed during my sojourn there.

A few pairs of the Golden Eagle still haunt the higher mountains of Inverness-shire and Argyleshire. I abstain from mentioning the exact localities, for fear of their extermination by too ardent collectors. A pair of White-tailed or Sea Eagles breed yearly on the precipitous rocks on the coast of Argyleshire. How grand they look! perched on the highest pinnacle, their eyrie is plainly perceptible. A very few Ospreys remain; I saw one fishing at sea, about two miles from land, off the coast. On Craig Muir a Peregrine was seen, and another near Loch Morar: this bird is getting very scarce on the west coast. The Merlin is the *bête noir* of some of the keepers in this district; they consider it more destructive to young Grouse than the Peregrine. It is in consequence becoming very scarce. The Kestrel, on the other hand, is very plentiful, and considered harmless by the keepers here and unmolested. Occasionally the Sparrowhawk is seen, but is scarce. There are usually two or three Buzzards about the woods of Arasaig and Forest of Rea. One stormy day two female Hen Harriers (or perhaps a female and immature bird) remained a whole day near a small loch, perched occasionally on a rail or bare branch of alder. The loch was frequented by numerous waterfowl. The Wild Ducks feeding close by took not the slightest notice of them, but the Teal were greatly alarmed, and on the hawks taking wing immediately either dived or took shelter in the reeds.

In many localities in the west the White or Barn Owl is still common; and the Tawny Owl is constantly heard in the neighbourhood of Arasaig House and other places in the district.

In August I noticed a pair of Spotted Flycatchers and their young on the railing of the lawn at Arasaig House; and another pair at Traigh House, where there were fewer this year than usual. On the River Aylort and other places the Water Ouzel was observed: I saw one rise from below the water to the surface

and immediately take flight. Both the Song Thrush and Blackbird were common here. No Ring Ouzels were observed in August, but about the middle of September they began to appear in small flocks. Last year in Ross-shire the same thing occurred; they used to frequent the cherry trees for the late fruit. The Hedgesparrow, Robin, and Redstart were common everywhere.

The Stonechat was not very numerous; on August 2nd a pair with young just able to fly near Ardafour. At Arasaig I saw the Whinchat. The Wheatear was very plentiful, both at Arasaig and South Morar, and, in fact, all along the west coast; on August 3rd some of the young were just able to fly. This bird seemed very fond of perching on rails and old stumps of trees. In the thickets round Arasaig House, and also at Traigh the Common Whitethroat was observed, and the Lesser Whitethroat and Willow Warbler at Traigh, South Morar.

In all the places above mentioned the Blue Tit was very plentiful, and two or three Coal Tits were seen in the firs at Arasaig. At this place and also at South Morar the Marsh Tit was observed. Pied Wagtails began to collect early in August, and Grey Wagtails frequented the lawns and gardens on the west coast. It is very amusing to see them coursing the flies in company with the Spotted Flycatchers and Swallows. I have seen as many as twenty on the terrace at Poltalloch. They certainly move southward about the end of September, when very few are to be seen.

The Meadow Pipit was very common all along the west coast, and several pairs of the Rock Pipit were seen along the rocky shores of South Morar. The Sky Lark is not at all common either at Arasaig, or at South Morar, although there is abundance of corn-land (oats). I only saw three or four whilst shooting over a very large area. The Yellowhammer was very plentiful, as was also the Chaffinch, particularly so this year; the gardens and grounds at Poltalloch and also at Arasaig swarmed with them.

On the west coast the House Sparrow is rather a rare bird, and is only found in some localities: I saw none in South Morar. The Greenfinch was common at Poltalloch, Argyllshire, Arasaig, and South Morar; and in the two first-mentioned localities I observed the Goldfinch. The Common Linnet is rather plentiful along the west coast, and large flocks of the Twite frequented the

fields and sea-shore of South Morar and Arasaig: they were very tame, allowing a near approach.

Bullfinches were common at Poltalloch and at Arasaig. In August they collect in small flocks, and frequent the larch and other plantations in this locality. The splendid colours of the old males were very conspicuous close to the terrace at Arasaig House. The flock appeared to follow a regular routine, as every day, at about the same hour, I found them in the same place.

Although Macgillivray and other authors say that the Starling is found in thousands in the Hebrides, there was scarcely one to be seen in the localities above mentioned during the months of August and September.

The Raven is indeed a bird of ill omen to the sportsman who may be after deer. His hoarse croak, as he flies overhead or sits upon the highest point of rock, is a warning the stags well know, and makes many a stalk fruitless labour. The Carrion Crow was not common, and very few Hoodies were observed this year either at Arasaig or South Morar; I do not think I saw a dozen during the ten weeks' residence. Last year at Killelan, in Ross-shire, they were very numerous. The Rook was commonly observed, but the Jackdaw was scarce about Arasaig and South Morar: lower down the coast this bird is so numerous that it has become a perfect pest from its daring depredations. It breeds in the inaccessible rocks by the sea-coast. The nests are very difficult, almost impossible, to be got at. Every man's hand is against them, and they are mercilessly destroyed.

In the woods close to Arasaig House the Great Spotted Woodpecker is very scarce, and was only once seen. The keeper informed me he had never seen one before. Along the whole of the west coast the Wren appears common. A young Cuckoo frequented the garden of Traigh House, South Morar, and was last seen on the 24th of August.

Very few Swallows were noticed this year, at Poltalloch, Oban, &c.; but further west, at Arasaig or South Morar, I do not think I saw one. The same may be said of the Martin: I saw one flock of them in August passing southward over Arasaig. The Sand Martin, on the other hand, was very plentiful about Poltalloch. On August 4th I saw a large flock of these birds sporting over Loch Ailt, near Arasaig. At Poltalloch and Arasaig I saw the Ring Dove, and on the rocks near the sea-shore at

Arasaig and South Morar the Rock Dove seemed common. This bird has a much more rapid flight than either the Ring Dove or the Stock Dove.

The Pheasant breeds and increases fast all along the west coast, the climate appearing to suit it, and the Black Grouse is common. Strange to say, the Red Grouse at Arasaig and South Morar are few in number, the climate or some other cause preventing their increase, although the heather, &c., appears to be admirably adapted for the birds; even this year broods were very few and far between. On the higher hills to the west of Loch Morar the Ptarmigan is found. Partridges are more plentiful on the low grounds. The Scotch Partridge is certainly smaller than the English bird. On the hills above Arasaig and South Morar a few Golden Plover may be found, while the Ringed Plover is plentiful on the sea-shore. This bird seemed to have greatly increased in numbers after the 20th August; dressed as Snipe it is an excellent bird for the table.

I saw a few Lapwings, with their young in immature plumage, at South Morar, but the birds were not yet in flocks. The Sanderling was plentiful on the sea-shore at South Morar after August 20th. The Oystercatcher, or "Sea-pie," was also very plentiful on the shores of South Morar. Its plaintive whistle was constantly heard at night. It proved an excellent bird for the table, and not at all fishy. It increased in numbers after the middle of August, and was then to be seen in small flocks.

On September 3rd I noticed that Herons were getting more plentiful, as if congregating towards the coast. Previous to the 20th of August solitary Curlews, or two or three together, used to frequent the shores and fields; after that date their numbers increased, and flocks of forty to fifty were constantly seen feeding in the meadows round Traigh House, South Morar. In the months of August and September the Curlew is very good eating, tender and of excellent flavour. After they leave the meadows and get down to the shore they become coarse and fishy. It is capital sport stalking Curlews, but two guns are requisite for success. Occasionally a Whimbrel was killed with the Curlews, but this bird was not plentiful.

Redshanks were observed coming in about the end of August, with rapid flight and uttering their peculiar cry: they are excellent eating, equal to any Snipe. The Greenshank was seen in twos

and threes along the shore of South Morar; they were very shy and difficult to get at: only one was secured by chance. About Loch Morar and other lochs on Craig Muir the Common Sandpiper was plentiful, but had not left its summer haunts in September. On September 3rd a Curlew Sandpiper, *Tringa subarquata*, was shot out of a small flock on the shore at the mouth of the River Morar, where on the same date there were large flocks of Dunlins, *Tringa alpina*.

The Woodcock was plentiful, breeding freely in all the woods round Arasaig and Traigh House. Those killed in August and September are mostly young ones. Fresh immigrants arrive in large numbers in this neighbourhood about the beginning of November and afford excellent sport. The Common Snipe breeds on all the moors in this neighbourhood: the migratory flights do not come in till November. When Snipe shooting in a marsh, the water half-way up to my knees, in patches of high grass and reeds, a Landrail was flushed and killed; and on a small loch in the same marsh I observed a Moorhen.

A small flock of Red-necked Phalaropes were met with on the sea-shore. I shot one (a male). They were very tame, and the other birds in the flock, after a short flight, came fluttering round the dead bird.

On an island in front of Traigh House a Canada Goose was reared with some domesticated Geese. Although well able to fly and take care of himself he never leaves them, and regularly at nightfall he wends his way with them across the bay to roost. On all the lochs and various marshes in the neighbourhood I saw the Common Wild Duck. Very few had come down to the sea on the 27th September. The Teal, too, was plentiful. The Eider Duck breeds all along the coast, particularly about Loch-na-Nuagh, and on Arasaig from four to five young ones with the old females were usually observed; very few males were seen. Some young ones were shot on August 27th, at which date they were still without their quill-feathers; their crops were full of shells, mollusks, and young crabs. Their colour was brownish black, with a streak of grey over the eye. They were seen in numbers on this coast at the date mentioned, and are increasing every year. The young are capital eating. A few Tufted Ducks had arrived on the coast at the end of September. I did not see them myself, but was told of the fact by the river-keeper.

The Red-breasted Merganser breeds on all the lochs and rivers in the neighbourhood, and comes down to the sea as soon as the young can fly. Broods of from five to nine were constantly seen. In stormy weather they come close in shore among the islands, and are then easily shot. They are most destructive to salmon and trout fry.

At South Morar a pair of Red-throated Divers frequented an isolated rock a short distance from the shore; they would come regularly about the same hour. The Common Guillemot was plentiful everywhere; the old females and young ones up to the 14th September had not collected in flocks. The Black Guillemot was also common, and the same remarks apply to this as to the last-mentioned species. In August only a few Cormorants were seen, but later on this bird became more plentiful, and a considerable number frequented the rocks and small islands. In September Gannets became more numerous about South Morar. In Loch-na-Nuagh, Arasaig, large numbers follow the shoals of herrings. These are generally birds in adult plumage, young birds being not at all common. The fishermen always look to the arrival of the Gannets as indicative of a plentiful haul of herrings.

The Common Tern is very plentiful, both at Arasaig and South Morar. Young ones hardly able to fly were seen on the 27th August, the parents very solicitous and feigning being wounded when the boat came near the rocks where the young birds had hidden themselves along the crevices. The Arctic Tern was also common: this bird fishes somewhat like the Gannet, and darts down with great rapidity on the small fish, even to immersing itself. A few of the Lesser Tern were observed about Loch-na-Nuagh and coast of South Morar. I saw a pair also on Loch Morar.

The Black-headed Gull was common. Very few Gulls of any species were observed on the coast in August, but they became more numerous in September; until then they had not left the inland lochs, which they frequent in the summer months in large numbers for the purpose of breeding, &c. A few Kittiwakes were observed on the coast, and numbers on Loch Morar. They were very solicitous of their offspring. A pair attacked a Heron which flew near their young, and so mobbed him that he was obliged to alight and defend himself with his beak; they never ceased their

attacks till he flew far away. The Common Gull was noted, and the Herring Gull was very common in August, frequenting all the fresh-water lochs in this neighbourhood. Large numbers of the Great Black-backed Gull were seen on Loch Morar and other lochs. On one occasion whilst stalking in the forest we suddenly came upon a small fresh-water loch, from which at least a hundred Black-backed Gulls rose from the rocks and water. They do not come down to the shore till the beginning or middle of September. I once saw a Skua, which I think must have been Richardson's, on Loch-na-Nuagh, but am not quite certain of the species.

Later in the year these waters are frequented by all kinds of wildfowl, and I have no doubt many more species could be added to this list.

OCCASIONAL NOTES.

THE POLECAT IN NORTH OXFORDSHIRE.—I have lately procured a fine specimen of the Polecat, which was trapped at Souldern, in this county, in May, 1876. It is now very rare in this immediate neighbourhood. The only other instances to my knowledge of its occurrence within the last few years are as follows:—One shot in an osier-bed on the Swere about seven years ago; one seen by myself in the summer of 1871 or 1872 on the banks of the Sorbrook; another near the same place the winter before last, seen by a shepherd carrying off a rabbit (but this may possibly have been a domestic cat); and, lastly, one which, as I am informed on good authority, frequents the parish at the present time.—O. V. APLIN (Bodicote, near Banbury).

BARTRAM'S SANDPIPER IN LINCOLNSHIRE.—On the 27th October, Mr. John Cooper, the well-known taxidermist of Radnor Street, St. Luke's, brought for my inspection a freshly-killed specimen of Bartram's Sandpiper, *Actiturus Bartramius*, in the flesh, which he had just purchased in Leadenhall Market. It was hanging up with a lot of Golden Plovers, with which it had been sent up from Lincolnshire. Enquiries subsequently made at my request failed to elicit the name of the locality whence it was obtained, there being apparently some mistaken impression on the part of the salesman as to the motive of the enquiry. In answer to my question whether he had examined any of the Golden Plovers, and particularly whether he had noticed the colour of the axillary plumes (which in the American Golden Plover are grey), Mr. Cooper replied that he had not. This is to be regretted, for I have often seen a single Sandpiper or Plover flying in company with a flock of a different species; and it is not unlikely that the Golden Plovers in question

may have been also of American origin, and this little flock of migrants may have brought the Sandpiper with them. I carefully dissected the bird, which I found to be a male, and prepared the sternum, which in point of size approximates to that of *Totanus fuscus*, and has the posterior margin doubly cleft as in *T. fuscus*, *calidris*, *glottis*, and other Sandpipers. The apex of the keel, however, is not pointed as in the species named, but rounded as in *Numenius*. It would be interesting to compare it with the sternum of the smaller short-billed Curlews, *Numenius borealis* and *minor*, to which *Actiturus* externally bears so close a resemblance. Upon examination of the stomach I found it to contain numerous fragments of the wing-cases of small beetles in such a condition as to be barely recognizable. Being unable to identify them myself, and being anxious to test, if possible, the accuracy of the statement that the bird had been killed in this country, I forwarded the entire contents of the stomach to Mr. E. C. Rye, whose knowledge of the *Coleoptera* I felt sure would enable him to satisfy me upon the questions I was anxious to have solved, namely, whether the fragments of *Coleoptera* forwarded belonged to British species; and if so, whether to British species not found in North America. In the event of his replying to both questions in the affirmative, it would be reasonable to conclude that the bird had been feeding in this country, and was really a British-killed specimen. Mr. Rye has been kind enough to reply as follows:—"You propound a question incapable of precise solution. The remains are so comminuted, and represent so many specimens and species, that I should be sorry to attempt a decided opinion. But after a tolerably long examination I can find nothing to make me believe the fragments of insects represent other than British species. There are remains of *Ocypus cupreus*, I am almost sure; also of a common little *Othius*, and the body of a tolerably large *Philonthus*; the elytron of *Cytilus varius* (I am nearly positive), and the anal forceps of many earwigs. All these a Sandpiper would readily find in our fens, but the bits are so champed up and disguised by cracking, &c., that no one could positively hang a poulterer on the evidence! There is nothing saliently North American, but unfortunately we have many species in common, and many so closely allied that such an examination as this could give little clue. I personally incline to think the bits are British." If, on the evidence adduced, then, we may add this specimen of Bartram's Sandpiper to the list of "Rare and Accidental Visitants," and it seems warrantable to do so, this will make the seventh example of this American species which has been procured in the British Islands. The half dozen specimens already recorded were obtained—in Somersetshire, autumn, 1847; in Warwickshire, October, 1851; Cambridgeshire, December, 1854; Gloucestershire, January, 1855; Cornwall, November, 1865; and Northumberland, November, 1879; all obtained either late in autumn or in the winter.—

J. E. HARTING.

THE AUTUMN MIGRATION OF BIRDS AT CROMER.—The following notes on the migratory birds observed here during the past autumn may be interesting:—About the 6th of October a Shag was caught in a fish-net at Runton, near Cromer, for the addition of which to my collection I am indebted to an ornithological friend. I did not receive it until the following week, but luckily I was able to save it. It is quite one of the rarest of Norfolk birds, though probably sometimes passed over for the Cormorant in its immature plumage, in which state my bird is. The great October migration of birds, for which the east coast is so good a place of observation, has this year been very interesting. Redstarts, Wheatears, Long-tailed Tits, Jackdaws, Woodcocks, and Rough-legged Buzzards have come trooping after each other in great waves, all bent on the same object. The two first-named were clearly going south, but the Jackdaws, Woodcocks, and a host of Larks, Starlings, Grey Crows, Fieldfares, &c., were going from east to west, while the invariable direction of the Gulls along the shore was from S.E. to N.W. On the 13th October I noticed a huge flock of small birds, which seemed to be entirely composed of Chaffinches, in a stubble on the cliff, which I am inclined to think must have come over the sea. Many Short-eared and a few Long-eared Owls appeared, and several Woodcocks were shot out of turnips, having dropped there directly on their arrival. I shot a Wheatear as late as October 26th, and on the same day saw a Green Sandpiper. The Rough-legged Buzzards have been the chief feature. The following list comprises only what have been seen during October within a few miles of Cromer:—16th, one seen at Trimmingham and one at Northrepps; 17th, one seen at Northrepps; 18th, two seen at Runton, one at Cromer, and one shot at Barningham; 19th, one shot at Siderstrand; 23rd, one seen at Northrepps; 25th, one seen at Metton; 28th, one seen at Trimmingham and one at Northrepps. Probably one or two are counted twice over. I hear one or two have been shot in other parts of Norfolk. On the 28th I saw a Grey Shrike at Trimmingham. It was on the topmost bough of a hedge, and allowed me to follow it for nearly an hour, flitting from one hedge to another, but always selecting the topmost bough for a look-out. Several others are reported in different parts of Norfolk, principally near Yarmouth. I hear that a Grey Shrike, doubtless the same bird, has been at Trimmingham for a month. I received a Storm Petrel from Ely on the 3rd of November, but I have not heard of any near Cromer. Yesterday (November 4th), when out shooting, we obtained two hen Pheasants beginning to assume the male plumage; this is not uncommon. A splendid Bohemian Pheasant was also shot on the 3rd, and a light-coloured hen, supposed to be a female "Bohemian," on the 4th. The male showed the white ring round the neck, which I have sometimes noticed before in this race.—J. H. GURNEY, JUN. (Northrepps, Norwich).

POMATORHINE SKUA ON THE DURHAM AND YORKSHIRE COASTS.—

I have to record the occurrence of another large flight of Pomatorhine Skuas at Redcar, a flight similar in some respects to that which visited this place on the 14th October last year (see Zool. 1880, p. 18), but not in such vast numbers—similar in this, that it consisted almost entirely of mature birds of the white-breasted variety, only three or four being dark-plumaged, but whether immature or adult I could not ascertain. While the terrific storm of October 28th was at its height, considerable numbers, amounting to several hundreds, of these Skuas passed Redcar, coming from eastward and seaward and going N.W. and W.; they passed along the front of the town flying close to the esplanade and houses, struggling to make headway against the storm, and, although possessed of great strength of wing, many of them were obliged to rest for a time on the water, or else were driven inland. Unconscious of danger, they flew within a few yards of those persons who had courage to venture out. I did not hear of any having been shot or captured in any way; in fact, it was well nigh impossible to stand out in the face of a blinding storm of hail, rain and sand driven by a N.E. hurricane of fearful severity, and shooting was entirely out of the question. Several Storm Petrels were observed, and a birdstuffer at Marske obtained three, two of which I have secured, as also a Fulmar picked up by a Redcar fisherman. Two Gannets were captured during the storm in an exhausted condition, and another Fulmar was picked up about the middle of October. Attention has been called to the manner in which the Pomatorhine Skua carries its tail, shut up like a fan. I may here state that last year, when the great flight of Skuas occurred at Redcar, I was very much struck by the peculiar appearance of the tails of these birds, especially those of the mature examples. When flying straight ahead the tail was closed, and had a most strange and unnatural look, giving the bird when seen from underneath almost the appearance of a cross, — } , the wings being nearly motionless, and the tail seeming to be much longer than was found to be the case on examining them after being shot. The structure of the Pomatorhine Skua is eminently adapted for rapid flight, and the tail plays an important part in guiding its owner in its evolutions when pursuing the Gulls and Terns. In several instances when I had shot a Skua, others came to the dead or wounded bird, and in their twistings and turnings while swooping round, continually opened and shut their tails, much in the same way as Terns do when fishing over a shoal of sprats.—T. H. NELSON (North Bondgate, Bishop Auckland).

BEE-EATER, GREY PHALAROPE, AND TENGMALM'S OWL IN LINCOLNSHIRE.—On August 16th a Bee-eater, *Merops apiaster*, was shot at Tetney Haven, seven miles south of Grimsby, by William Stubbs, a professional shore-shooter. Stubbs had seen the bird on the previous day; on Monday

he went out with his gun, and after a long chase succeeded in procuring it. On October 22nd I got a Grey Phalarope, shot on the 21st in the same locality; it is in fine winter plumage. On November 5th I was shown by Kew, the Louth birdstuffer, a very fine Tengmalm's Owl, *Nyctala Tengmalmi*, shot on October 22nd by the son of the Rev. J. Pretymann, of Carlton, on the sandhills near Saltfleet Haven. It is a mature bird, the plumage somewhat injured in shooting; sex undetermined. This bird must have arrived with the same winds (N. and N.W.) which brought the great flight of Woodcocks on our coast from Flamborough to Cromer on the night of October 18th and morning of the 19th, and again on the 22nd, along with large numbers of Short-eared Owls and other immigrants.—JOHN CORDEAUX (Great Cotes, Ulceby).

NESTING OF MONTAGU'S HARRIER.—Seeing Capt. Hadfield's remarks on Mr. Walter Raine's note in 'The Zoologist' for September (p. 404), I take the liberty to correct Mr. Raine's statement respecting the nest, &c. The nest was about two feet from the ground, but made on the top of a thick cover of brambles near the edge of a large wood, and made of sedges, grass, and rushes, large and flat, with a very little hollow in the centre slightly lined with sheep's wool. It contained one egg, which I took. The egg is pale blue, smaller than those of the Hen Harrier, and not marked, except by one or two green spots, which I thought were stains from some of the nest material. The bird was startled off its nest by the sound of my gun, which drew my attention to the place. In its flight it never rose more than three feet from the ground, remaining at that height as it flew down the side of the adjoining field. Whence Mr. Raine obtained his information respecting the nest, its materials, and the date of finding, I do not know, as he took no notes whilst I was describing the nest to him, and must have written from memory—a very uncertain method. I may add that I did not name the egg myself, but left that to others who inspected my collection.—GEORGE A. WIDDAS (Leeds).

BLACKCAP IN IRELAND.—Having read in 'The Zoologist' for November (p. 488) a record of the occurrence of the Blackcap, *Sylvia atricapilla*, at Oldeastle, Co. Meath, in which Mr. Benson makes the remark that "This is, I think, the only instance noted this year of the occurrence of this bird in Ireland," I wish to offer the following observation:—On May 13th my friend Mr. R. M. Barrington gave me the opportunity of observing several Blackcaps at his residence, Fassaroe, near Bray, Co. Wicklow, when I made myself familiar with their thrilling and unmistakable song. On May 17th I heard and saw several near Enniskerry, in the neighbourhood of Fassaroe. On May 29th I heard the song of and saw the Blackcap at Woodlands, Co. Dublin. On June 19th I saw and heard Blackcaps in full song in several places at Powerscourt, Co. Wicklow. On June 22nd,

between Powerscourt and Sugarloaf, I noticed several Blackcaps in full song. So that it would appear that this bird is by no means very rare in the neighbourhood of Dublin, where my friend Mr. Barrington believes it breeds annually.—H. CHICHESTER HART (7, St. Stephen's Green, Dublin).

SPONBILL IN CORNWALL.—From what I have lately read it appears that an unusual number of Spoonbills have made their appearance on various parts of the British coast during the present autumn, and I have to record the capture of one near the St. Germain's river, Cornwall, early in November. It was examined in the flesh by me on the 9th instant, and was a bird of the year, with the plumage of a dull white, without any crest, or buff band on the breast, and the bill perfectly smooth, without ridge or wrinkle, apparently of a lighter hue when first killed, but now changed to an uniform pinkish lead-colour. The poor bird must have suffered dreadfully, as the bone of one wing was much shattered, and the wing itself badly twisted. St. Germain's river seems to be a favourite haunt for this species when it makes its appearance in Cornwall. On a former occasion I examined three which had been killed there at one time, and since then several single individuals have been procured there at various intervals. I much wished to have examined the trachea of the above-mentioned specimen before it was detached from the body, as the birdstuffer promised I should do; but arriving at his house I found that the body had been taken out, the trachea hanging in a straight line without any sign of convolution, but which perhaps might have been different when in its proper place. I had nearly forgotten to mention that the shafts of the primaries were black and the tips of a brownish hue. I have enclosed two feathers of the Spoonbill, which you might perhaps like to see, as they are curiously barred, or rather eaten through. By holding them up to the light you will see what I mean. They were taken from between the shoulders and from the wing-coverts near the tertials—quite similar on both sides of the bird and in the same places. I at first thought they were regularly barred with dusky lines. I think I have noticed something of the kind in other young birds, but not to such a great extent; they cover a large space on the plumage.—JOHN GATCOMBE (55, Durnford Street, Stonehouse, Devon).

[The feathers present a singular defect caused by starvation, known to falconers as "hunger-traces." It appears as a line of imperfection across the web of each feather, chiefly in those of the wings; while on the shaft the mark may be not only seen but felt as a slightly projecting ridge. The injury from this cause is sometimes such as to occasion the feathers to break off at the "hunger-traces," and the mark seen on the web is doubtless owing to the breaking off of all the fine fibres of the web in the line of the trace.—ED.]

THE TRACHEA OF THE SPOONBILL.—At p. 488 Mr. H. Langton reports the capture of two Spoonbills, in which the trachea was not convoluted in the usual way into a figure-of-eight shape. I have a young Spoonbill, shot at Yarmouth in 1871, which I carefully examined, and in which this peculiarity certainly did not exist. I examined two which I obtained in Egypt, and found only a very slight flexure of the windpipe. One of them was certainly a young bird, and I think the other was. I have no doubt that, as Yarrell says, the absence of this peculiarity is a sign of immaturity.—J. H. GURNEY, JUN. (Northrepps, Norwich).

KING EIDER AT THE FARNE ISLANDS.—In one of my migration schedules recently received from the Inner Farne Lighthouse I find this entry:—"May 29th. King Eider seen this evening (being the first for several years)." To this my very intelligent informant, Mr. Thos. Cutting, the Principal of the lighthouse, adds the following note:—"The bird mentioned in my report of the 29th April was seen by several of the fishermen about ten days before, or a fortnight before I saw it. It was often seen both flying and swimming with the common Eider ducks. When swimming it was noticed to be in company with a duck of a cream-coloured plumage (quite different from the Eider duck), which was supposed to be the female of the same species." As the female of the King Eider so nearly resembles that of the common species as to be quite indistinguishable at a short distance, this duck of "a cream-coloured plumage" could not be the mate of the King Eider, and raises some little doubt as to the authenticity of the occurrence of the rare visitant. Mr. Hancock, in his 'Birds of Nosthumberland,' records the occurrence of a male and female King Eider in the summer of 1873 at the Farne Islands.—JOHN CORDEAUX (Great Cotes, Ulceby, Lincolnshire).

GREAT CRESTED GREBE NEAR LEEDS.—During the second week in September I was informed that a couple of Grebes were to be seen on Waterloo Lake, Roundhay Park. On the 18th of that month my brother and I visited the above-mentioned place, and found them to be a pair of the Great Crested Grebe. We watched them for some time, and with the aid of a field-glass, were able to observe them very distinctly. These birds are very scarce in this neighbourhood. We also saw a brood of young Waterhens, apparently not more than a week old. I have never met with young Waterhens so late in the year before.—WALTER RAINE (Leeds).

HERONRIES IN IRELAND.—In addition to the list of Heronries in Ireland given by Mr. Harting in 'The Zoologist' for 1874, I may add that there is one at Tower Hill, Pallas Green, Co. Limerick. There are about fifteen or twenty nests, some of them great piles of sticks built at the tops of lofty Scotch firs.—WILLIAM W. FLEMING (18, Upper Fitzwilliam Street, Dublin).

ROOKERIES IN LONDON.—All the trees on which the Rooks built their nests in Kensington Gardens have been cut down. It will be interesting to notice if the birds will still keep to the locality, or build on the trees which are left. The rookery in the plane trees of Wharnccliffe House, Curzon Street, is deserted.—EDWARD HAMILTON (9, Portugal Street, Grosvenor Square).

GREY PHALAROPE NEAR KINGSBRIDGE, DEVON.—It may be of interest to readers of 'The Zoologist' to hear of the occurrence, on September 18th, of a couple of Grey Phalaropes on the Devonshire coast near Thurlstone, Kingsbridge. When first noticed they were running on the mud and feeding in the manner of Moorhens, but on my approach they took to the water and swam with much lightness and grace. They were very fearless, and I secured both birds with a walking-stick gun. Their plumage is in the transition state between summer and winter.—BRYAN HOOK (Silverbeck, Churt, Farnham).

SUBCUTANEOUS WORMS IN PEREGRINE FALCON.—Last spring I obtained the body of a Peregrine Falcon from a birdstuffer in York for dissection. I had almost finished, when I noticed several white worms under the skin of the back of the abdomen. They were about two inches and a half long, white, hard, round, and tapering at head and tail; in fact, exactly corresponding to Lieut. Becher's description of those he found in the Red-backed Shrike (p. 487). I think the fact of similar worms being found in two rapacious birds is decidedly significant. I thought nothing of them at the time, and threw them with the remains into the ashpit; but about a month afterwards, on reading a book on parasitic worms, my curiosity was awakened.—A. BEVINGTON (20, Bootham, York).

CROSSBILLS BREEDING NEAR YORK.—In 'The Zoologist' for September Mr. Walter Raine has a note under this title. I wish he had stated the facts correctly. The nest of four eggs which I took out of a fir tree in a large wood at the place mentioned was about an arm's length from the top of the tree, and not half-way up as described, and it was the bird leaving the tree that made me think of going up. I find, on referring to a note made at the time, that the only description is that the nest was similar to that of a Greenfinch, but larger and flatter; the four eggs were larger and rounder than Greenfinch's. I had the eggs named by others, not feeling myself competent to identify them for certain, though I have been now thirteen years collecting.—GEORGE A. WIDDAS (Leeds).

ESQUIMAUX CURLEW IN KINCARDINESHIRE.—At p. 485 Mr. Harvie Brown has referred to the capture of a specimen of this bird on a hill in the Forest of Birse, on September 21st. As the specimen was forwarded to me for preservation, it may be interesting to some of your readers

if I add that the bird in question was an adult male, and on examination the stomach was found to contain crow-berries.—GEORGE SIM (20, King Street, Aberdeen).

VARIETIES OF COMMON BIRDS.—The other day Mr. Wilks, gunmaker, showed me a variety of the Sparrow that had been shot at Roundhay during the second week of October. It was of a uniform pure white, with the exception of the wings, which were tipped with light brown. The following varieties have also been obtained in this district during the past year:—A cream-coloured Corn Bunting; a dark buff-coloured Starling; a Rook with its wings barred with white; and a Blackbird with its back and wings liberally dashed with white.—WALTER RAINE (Leeds).

MODEL OF THE GREAT AUK.—Mr. George Pinfold, taxidermist, of 217, Hampstead Road, London, has at present on view a life-size model of the Great Auk, so skilfully made with feathers of the Razorbill as to present a most natural appearance, the bill being carefully modelled and coloured from the specimen in the British Museum. We believe the price asked for it is £10, and considering the time and labour which must have been bestowed upon its preparation and the excellence of the workmanship, this does not seem high, especially when it is remembered that the value of a genuine specimen at the present time is at least £100. We recommend it to the notice of curators of museums. As the next best thing to a real one, a good model like this in a public museum would enable visitors to form a very good idea of the appearance of this remarkable and now extinct bird.—ED.

PROCEEDINGS OF SCIENTIFIC SOCIETIES.

LINNEAN SOCIETY OF LONDON.

November 4, 1880.—Prof. ALLMAN, F.R.S., President, in the chair.

The following gentlemen were elected Fellows of the Society:—Messrs. Edward Brown (Newcastle-on-Tyne), H. E. Dresser (Tenterden Street, London), and T. Fraser Pirpe (Bengal).

Mr. H. C. Sorby brought to notice drawings of some British Sea Anemones found by him attached to the upper fronds of long sea-weeds in deep water; and he mentioned that in his late cruise round the coast in his yacht a solitary cream-coloured Cetacean had been seen, though unfortunately the species could not be determined.

Prof. T. Spencer Cobbold exhibited, along with sketches, a remarkable Trematode from the horse. It was discovered by Dr. Sonsino at Zagazic during the Egyptian plague, with which outbreak, however, the parasite had

no necessary connection. The worm (*Gastrodiscus Sonsinonis*) appeared to be an aberrant Amphistome furnished with a singular ventral disc, whose concavity was lined with about 200 small suckers, which when viewed with a pocket lens presented a tessellated appearance. In this respect its nearest approach was a worm infesting a genus of spiny-finned fishes (*Cataphractus*) belonging to the *Triglidae*. According to information recently received from Prof. Leuckart, anatomical investigation throws doubt on its Amphistomoid affinities.

The Secretary read, for the author, a paper "On the *Papilionidæ* of South Australia," by Mr. J. G. Otto Tepper. The specimens were captured chiefly in the counties Adelaide, Light, Sturt, and Ferguson, York's Peninsula. The scarcity of butterflies in the province, thirty species in all, as compared with other countries, is somewhat remarkable, and the sombreness of their coloration is also notable. Brick-red, various shades of brown, white, and black are the most frequent tints among the larger species, these seeming to agree with the surroundings of their habitat; for the author mentions having at times had difficulty in recognising insects when settled, so closely did they approximate in colour to the ground. Mr. Tepper expresses his belief that the small numbers of the *Lepidoptera* in this part of Australia is due to the great dryness of the atmosphere, for the frequency of occurrence in any given locality seems to bear a proportion to the presence or absence of surface-water. During the N.W. winds they collect in groups in shady places, and they are then weak and lethargic, many being found dead. Brief notes on habits and locality are appended to descriptions of most of the species found by the author, and the following names are provisionally given to forms which he has been unable to identify:—*Hesperilla trimaculata*, *H. quadrimaculata*, *H. bifasciata*, *H. atro-alba*, *H. lutea*, and *H. gracilis*.—J. MURIE.

ZOOLOGICAL SOCIETY OF LONDON.

November 16, 1880.—Professor HUXLEY, F.R.S., Vice-President, in the chair.

The Secretary read a report on the additions that had been made to the Society's Menagerie during the months of June, July, August, September, and October, 1880, and called attention to some of the more remarkable accessions which had been made during that period, *viz.*:—A male Leonine Monkey, *Macacus leoninus*, from Arracan, received in exchange, June 14th, from the Zoological Gardens of Calcutta. A Tufted Umbre, *Scopus umbretta*, from Africa, purchased June 26th, being the first example of this peculiar African form that has been received. A pair of Ocellated Turkeys, *Meleagris ocellata*, from Yucatan, presented by Mr. W. E. Sibeth, July 20th. Two

Tcheli Monkeys, *Macacus tcheliensis*, from China, north of Pekin, presented by Dr. S. W. Bushell, of H.B.M. Legation, Pekin. A Michie's Tufted Deer, *Elaphodus Michianus*, purchased August 25th, being the fourth example of this rare ruminant obtained. A young pair of the Koodoo Antelope, *Strepsiceros kudu*, purchased August 26th. A pair of Gayals, *Bibos frontalis*, from the hills of Chittagong, received in exchange from the Zoological Gardens of Calcutta. A pair of young Polar Bears, *Ursus maritimus*, brought from the Polar Seas, and presented to the Society by Mr. B. Leigh Smith. An Ivory Gull, *Larus eburneus*, also from the Polar Seas, and presented by the same donor, being the first example of this species that has been received. An Indian Jerboa, *Alactaya indica*, obtained in May last in the Logar Valley, between Kabul and Guzni, and presented to the Society by Major W. E. Money.

Mr. W. K. Parker read a paper on the development of the skull in the Urodele Batrachians. Mr. Parker described the skull of the adult Gigantic Salamander (*Sieboldia marina*), the Siren, and the Menopoma, and compared their structure with that of the various stages of the skull of the common Newt.

Mr. G. E. Dobson exhibited and made remarks on the head of a Partridge, *Perdix cinerea*, with an extraordinary prolongation of the intermaxillary bones.

Mr. W. A. Forbes made some remarks on the shedding of the horns of the Prong-buck, *Antilocapra americana*, which had recently taken place in the specimen living in the Society's Gardens.

Mr. Harting exhibited and made remarks upon a specimen of Bartram's Sandpiper, recently killed in Lincolnshire.

Mr. Selater exhibited the skin of the Guinea Fowl, lately described in the Society's 'Proceedings' as *Numida Elliotti*. Further investigation had induced him to believe that this bird was the same as *Numida pucherani* of Hartlaub, the inaccurate colouring of the head in Mr. Elliot's figure of that species having prevented its identification.

Mr. G. A. Boulenger read a paper on the Palæarctic and Æthiopian species of *Bufo*, of which he recognised ten species—four in the Palæarctic, five in the Æthiopian Regions, and one found in both regions.

A communication was read from Dr. Otto Finsch, in which he gave a list of the birds collected at the Island of Ruk, in the Central Carolines. A second communication from Dr. Finsch contained the description of some new or little-known species of Pigeons from the Caroline Islands.

A communication was read from Mr. Edgar A. Smith, containing an account of the shells of the genus *Myodora* of Gray.

A communication was read from Mr. Martin Jacoby, in which he gave the descriptions of a collection of Phytophagous Coleoptera, made by Mr. Buckley at Eastern Ecuador. The collection contained many new and

interesting species, of which a great part were not alone inhabitants of Ecuador, but had been found either in Peru or the Amazon Regions.

A paper by Messrs. F. D. Godman and O. Salvin was read, in which they gave the descriptions of some supposed new species of butterflies collected by Mr. Andrew Goldie, at a place some thirty miles in the interior from Port Moresby, New Guinea.—P. L. SCLATER, *Secretary*.

ENTOMOLOGICAL SOCIETY OF LONDON.

October 6, 1880.—H. T. STAINTON, F.R.S., Vice-President, in the chair.

Sir Arthur Scott, of Birmingham, and 97, Eaton Square, W., and Mr. Frank Edward Robinson, of 10, Little Clarendon Street, Oxford, were balloted for and elected ordinary Members.

Mr. M'Lachlan stated that last year (Proc. Ent. Soc., 1879, p. xliii) he had exhibited specimens of *Anthocoris nemorum*, an Hemipterous insect, which, under the name of the "needle-nosed flea," had been supposed by a correspondent residing near Canterbury to be damaging the hops in that neighbourhood. At the time of exhibiting the specimens he had expressed the opinion that this insect was not the true culprit, its habits being probably carnivorous, and he had recently heard from the same correspondent that the hops were much less attacked this year, and that a small larva had been found in the cones on careful examination. Specimens of this larva were now exhibited, Mr. M'Lachlan considering them to be those of some fly, and further expressing his belief that the *Anthocoris* was in search of this Dipterous larva, and was thus of service to the hop-growers.

Sir Sidney Saunders exhibited a series of apterous females of the new species of *Scleroderma* adverted to at the previous meeting, which he had obtained from a number of cocoons closely connected together within the empty cell of a *Raphiglossa* in briars from Epirus. He also explained various circumstances connected with their structure and habits, which, together with a full description of the species, he proposes to bring before the Society in a separate form.

The Rev. E. N. Geldart, who was present as a visitor, exhibited and made remarks upon a variety of *Argynnis selene*, captured on July 5th between Reigate and Betchworth.

Mr. E. A. Fitch exhibited, on behalf of Mr. Theodore Wood, a specimen of *Acronycta megacephala*, with only two wings, having been found in this state on a tree trunk.

Mr. Ralfe, who was present as a visitor, exhibited a specimen of *Vanessa antiopa*, taken on Wimbledon Common, August 24th, 1880; also a specimen of *Acontia solaris* from Eastbourne, captured August 12th, 1880, and a very bleached specimen of *Plusia gamma*, received from some dealer, and of doubtful history.

Mr. W. F. Kirby exhibited, amongst other varieties of British Lepidoptera, a series of varieties of *Argynnis selene* taken by his son at Dusseldorf. The most remarkable form is shown in the accompanying figures:—



Mr. Hildebrand Ramsden communicated a note on the "Cucuyo," or native Firefly of Cuba, *Pyrophorus causticus*.

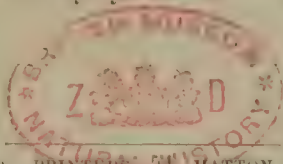
Mr. A. H. Swinton read two papers entitled "Some experiments on the variability of Lepidoptera, undertaken during the year 1880," parts i. and ii., and exhibited specimens and figures in illustration.

Mr. A. G. Butler read a paper entitled "Observations upon certain species of the Lepidopterous genus *Terias*, with descriptions of hitherto unknown forms from Japan."

Mr. C. O. Waterhouse communicated a paper "On the *Buprestide* from Madagascar," and Mr. F. Moore a paper "On the Asiatic Lepidoptera referred to the genus *Mycæsis*, with descriptions of new genera and species."

Mr. W. F. Kirby called the Society's attention to the circumstance that M. André, who is publishing a work on European Hymenoptera, sometimes prints descriptions of new genera and species which are forwarded to him too late for insertion in the body of the work, not only on the cover of his quarterly parts, but even at the end of sheets of advertisements laid loosely between the pages of a part. He also mentioned that coloured plates of butterflies were published in Paris with MS. names taken from Boisduval's collection attached, the species being in most cases well-known forms which had long been properly described or figured by other entomologists.

A discussion relating to M. André's practice then took place, in the course of which remarks were made by Mr. McLachlan, Mr. Distant, and other Members, the general opinion being that such a mode of describing genera and species was most derogatory to Science, and that it was much to be deplored that the Society had not the power of enforcing a rule that such descriptions should be ignored by systematists.—R. MELDOLA, *Hon. Sec.*



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